1942 SPECIAL BULLETIN No. 213

STATE OF NEW YORK
DEPARTMENT OF LABOR
MICHAEL J. MURPHY
Acting Industrial Commissioner

ESSENTIALS OF HEALTH MAINTENANCE IN INDUSTRIAL PLANTS

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LEONARD GREENBURG, M.D.
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Photo by Gordon Coster Reproduced by courtesy of *Fortune Magazine*

Figure 1—Safety Meeting

FOREWORD

With the current necessity for speed in production it is essential that attention be given to ways and means of increasing and maintaining the efficiency of the individual worker. His fitness has become, not a somewhat remote humanitarian ideal, but a vital and immediate necessity. The conservation of manpower is as important as the prevention of waste of materials or deterioration of machines.

Since experience has shown that the conservation of manpower in industry is closely related to the medical care and service which the industrial worker receives, it is pertinent to present concrete information on recommended medical practices for industrial plants.

This material, for the most part, is not new, but has been taken from various sources with the idea of including in one publication a summary of information on this subject which, it is hoped, will be of interest and value to employers in New York State.

CONTENTS

INTRODUCTION

ORIGIN AND PURPOSE OF MEDICAL SERVICE

Medical services for workers in industry had their origin in the need to provide prompt and effective first-aid treatment in the plant, so that the injured worker could be protected against complications arising from delayed medical treatment. The passage of compensation laws by one State after another has added a financial incentive to the humanitarian aspects of this problem, i.e., the natural desire to shorten the worker's illness and return him to his job as soon as possible. Though the early compensation laws covered industrial accidents only, the economy to industry in reducing lost time soon became apparent and the larger plants began developing more or less elaborate programs for the medical care of their workers. In some cases these went far beyond the giving of adequate first aid and gradually came to include the prevention of accidents and occupational diseases and steps to assure health maintenance in its broadest sense.

At the present time the basic objectives of industrial medicine are expressed by the American College of Surgeons [1] and the American Medical Association [4] as follows:

1—To ascertain by examination the physical and mental fitness of employees for work.

2—To maintain and improve the health and efficiency of those already employed.

3—To educate the worker in accident prevention and personal hygiene.

4—To reduce lost time and absenteeism from illness or injury.

NEED FOR MEDICAL SERVICE

The magnitude of the problem of time lost from accidents and illnesses among industrial workers is shown in all studies of this subject.

The American College of Surgeons [1] found that approximately one-half day per person in industry is lost annually from industrial accidents and that approximately eight days per year per person are lost from illnesses and other causes.

The Metropolitan Life Insurance Company [2] estimates that actual lost time owing to temporary disabilities sustained in *occupational accidents* in the United States averages at least 800,000 days each week or 40,000,000 days each year.

The total amount of time lost from *non-occupational diseases* in industry in 1941 has been estimated by Lynch [3] as amounting to 3,000,000,000 man-hours or 400,000,000 work-days.

Since in New York State, according to the latest available census (1930), there were approximately five and one-half million* gainfully occupied workers, absenteeism of eight days per year per person would mean roughly an annual loss of 44,000,000 man-hours of work and of $220,000,000 in wages (at a wage rate of $5 per day). Such losses constitute a real challenge to industry to test its efficiency and resourcefulness in the field of preventive medicine.

If industrial medical care could reduce this annual absenteeism by even one-tenth, large savings in production and wages would result.

BENEFITS OF MEDICAL SERVICE

What may, in fact, be expected in tangible savings from the establishment of health and safety programs in industry has been estimated by several agencies.

The Public Health Service [5] estimates that a saving of $8,600 annually per 1,000 workers may be expected from "services and equipment necessary for greater control of occupational accident hazards" and that medical services which result in a saving of as little as two-thirds of a day per employee would save the employer $4,000 per year per 1,000 workers on the payroll.

The estimated minimum monetary value to industry of medical and engineering services for health and accident protection is summarized in Table 1, taken from the study quoted. These savings were demonstrated as attainable for establishments in which the industrial accident rate is below the average, and in which there are no occupational health hazards. In industries having high accident rates and using toxic substances the savings would be greater.

In an investigation by the National Association of Manufacturers [6] of 1,388 companies throughout the country it was found that health and safety programs had actually resulted in a reduction of occupational disease by 62.8 per cent, of accident frequency by 44.9 per cent, of absenteeism by 29.7 per cent, of compensation insurance premiums by 28.8 per cent, and of labor turnover by 27.3 per cent. As a result, the average 500-employee plant was able to make a net saving of over $5,000 annually. This does not take account of actual time saved for production.

COST OF MEDICAL SERVICE

The per capita cost of medical service does, of course, vary considerably, depending on the size of the plant, the type of industry, and the extent of the medical program.

* The figure is undoubtedly larger at the present time (1913).

TABLE 1 — ESTIMATED SAVINGS TO EMPLOYER AND TO EMPLOYEES RESULTING FROM THE INSTITUTION OF MEDICAL AND ENGINEERING SERVICES FOR HEALTH AND ACCIDENT PROTECTION

Items in the saving	Annual saving, per 1,000 employees
To the employer:	
Reduction of 7 compensable accidents from the present rate per 1,000 employees (or an equivalent decrease in noncompensable injuries and no-injury accidents which destroy property)	$8,600
Reduction of two-thirds of a day in the sickness time-lost rate per 1,000 workers (or the equivalent in decreased mortality, estimated as worth to the employer 1½ times the amount paid in wages — average daily wage of $4 assumed)	4,000
Total to the employer	*$12,600*
To the employees:	
Amount which employees spend for medical services which may be furnished by an industrial physician	$3,600
Value of wages at $4 per day, saved by a reduction of two-thirds of a day in the sickness time-lost rate per 1,000 persons (or the equivalent in decreased mortality)	2,600
Total to the employees	*$6,200*
To both employer and employees	**$18,800**

Source: "An Estimate of the Monetary Value to Industry of Plant Medical and Safety Services," by Dean K. Brundage. Pub. Health Rept's. Aug. 21, 1936.

The National Industrial Conference Board [7] in 1930 estimated that the average annual cost of medical service, consisting of the minimum equipment of a well supplied dispensary and the minimum personnel of a full-time trained nurse amounted to $5.10 per employee. This estimate was based on information provided by 276 companies employing 492,579 workers.

The American College of Surgeons, previously quoted, made a study of medical costs in 299 industrial organizations. These plants reported a medical cost of $5.10 per employee for 1936. The reporting companies maintained a minimum of a first-aid room, an attendant—usually a graduate nurse—and doctors serving on call, part or full time.

In establishments having 1,000 or more employees, compensation and medical per capita costs were $8.42, compared with a cost of $13.52 in plants having less than 500 workers. This is largely accounted for by a better organization of medical services in larger plants. Per capita costs according to industry, in the study quoted, varied from $2.52 in the leather and tanning industry to $13.21 in non-ferrous metal plants.

MEDICAL SERVICE IN THE SMALL PLANT

NEED FOR MEDICAL CARE IN SMALL PLANTS

Since the relative cost of medical services tends to vary in inverse ratio to the size of the plant, it is obvious that small plants, as a rule, will be able to provide only a limited medical program. Yet the problem of the small plant is of two-fold importance.

In the *first* place, small plants greatly predominate in industry. According to the U. S. Census of Manufactures for 1937, plants employing 500 or less workers constituted more than 98 per cent of industrial establishments, and employed 59 per cent of wage-earners (Table 2). In New York State the number of factories employing less than 500 workers constituted 46,596 of the 46,883 plants (99.3 per cent) and employed 72 per cent of our total industrial workers.[8]

In the *second* place, there are more lost-time accidents in small plants than in large ones. Newquist [1] reports that in 1936, in proportion to hours worked, there were 62 per cent more lost-time injuries in small plants than in large.

There is no doubt that lack of immediate adequate first-aid attention in many small plants increases the chances of infection and causes lost time to result from minor injuries which would otherwise be negligible.

MEDICAL SERVICES WHICH THE SMALL PLANT CAN AFFORD

Because of their numbers, the fact that they employ a majority of industrial workers, and have a much higher lost-time accident rate than larger establishments, it is obvious that the need of medical service in small plants is of paramount importance. Special attention is, therefore, given the subject in this publication.

No matter how small the plant, it can afford the following medical services:

1—It can maintain a good first-aid kit and put it in charge of an employee trained in first-aid work.

2—It can institute a program for the prevention of occupational diseases and accidents.

3—It can educate its employees in matters pertaining to safety and health.

These three aspects of a medical program for small plants will be dealt with in the order mentioned.

TABLE 2 — DISTRIBUTION OF INDUSTRIAL ESTABLISHMENTS ACCORDING TO NUMBER OF EMPLOYEES, UNITED STATES, 1937

Establishments employing —	Number of establishments	Number of wage earners
Number of wage earners:		
None	6,885	.....
1 to 5 wage earners	62,164	170,174
6 to 20 wage earners	46,402	514,487
21 to 50 wage earners	23,138	750,922
51 to 100 wage earners	11,911	852,373
101 to 250 wage earners	9,745	1,522,670
251 to 500 wage earners	3,911	1,363,000
501 to 1,000 wage earners	1,660	1,333,323
1,001 to 2,500 wage earners	737	1,080,534
2,501 or more wage earners	241	1,181,748
Total	166,794	8,569,231

Source: U. S. Census of Manufactures. 1937.

First Aid

In some States, the type of first-aid equipment to be provided by the employer, particularly in the more hazardous industries, is prescribed by law. Legal requirements, however, are necessarily minimal requirements and it is highly desirable that even small plants should go as far beyond these minimal requirements as they can afford to do.

The first-aid kit

Only the very small plant that is located in close proximity to a hospital, or has readily available to it the services of local medical practitioners, should limit its medical services to a first-aid kit.

Where reliance is to be placed on a first-aid kit, great pains must be taken to insure its greatest possible effectiveness. Careful thought must, therefore, be given to its *location* in the plant, its *contents*, and its *upkeep*. Someone must be given responsibility for the administration of first-aid care and for replenishing materials as they are used up. Otherwise the kit will soon become of little practical value in an emergency.

Obviously, a first-aid kit may be the source of a hazard rather than an aid to the injured worker if anyone may have access to it; if its contents become contaminated by improper use; if labels which wear off are not replaced; and if anyone is free to store anything he wishes in the first-aid kit for safekeeping.

Location of Kit

In deciding on the location of the first-aid kit, consideration should be given to the desirability of having more than one such kit, in order that first-aid equipment may be readily accessible to all working zones, and more particularly to the potential sources of accident, if there are any, in all zones.

In general, an effort should be made to locate the first-aid kit:

1—As near to the operating zone or zones of the plant as possible.

2—Not too far from existing toilet facilities.

3—In close proximity to a basin with running hot and cold water.

4—Where it can be best supervised and cared for.

5—Where a reasonable degree of privacy and quiet may be expected.

In a given plant, it may not be possible to find a location which meets all of the above requirements simultaneously. Where this is the case, it will be necessary to achieve the best possible compromise.

Contents of Kit

The contents of a first-aid kit need not be elaborate. Indeed, where sole reliance is placed on a first-aid kit, procedures are necessarily limited to the simplest forms of first aid. The simpler the set-up, also, the better and the easier will be the upkeep.

While the contents will necessarily vary with the type of plant, the nature of the machinery and materials used, and the type of accident which is most apt to occur, it would seem desirable for every first-aid kit to include the following items:

Absorbent cotton
Adhesive tape 1″
Applicators
Aromatic spirits of ammonia
Assorted bandage compresses
Assorted safety pins
Assorted splints
Bicarbonate of soda
Castor oil
Eye cup
Gauze bandages 1″, 2″ and 3″
Medicine droppers
Mild iodine
Paper drinking cups
Scissors
Sterile gauze
Tannic acid burn ointment
Teaspoon
Tourniquet
Triangular bandages

Packaging First-Aid Supplies

These supplies should be packaged in *small* containers and in *small* quantities, so that once opened they can be destroyed. The inherent difficulty of keeping a first-aid kit clean and sanitary under the conditions of use in a small plant is so great as to require resort to special ways and means of making the situation as fool-proof as possible. Too much stress cannot be placed on the matter of never permitting anyone to return to the first-aid kit anything which has been opened and used. To achieve this purpose several courses of action suggest themselves:

1—*Individual containers*—Materials may be packaged in capsules or very small, especially designed containers holding little more than would be needed for a single application or use. The remainder can then be thrown away. This principle is followed in some first-aid kits sold especially for industrial use by manufacturers of industrial protective equipment.

2—"*First-aid dispenser*"—One is inclined to seriously consider the use of a radically different type of first-aid kit from that now available. This might be composed of a series of enclosed air-tight dispensing compartments, one for each separate item. In the case of some items, a single compartment might dispense a very small packet containing several items. The contents of any one of the dispensing units could be obtained by pressing a button. Such a dispenser would automatically eliminate the possibility of replacing partly used materials. It would insure cleanliness and orderliness for the contents at all times. It would be a great step in advance for first-aid kits for industry. Such a first-aid kit could be regularly serviced by the distributors, thereby insuring the routine replenishment of supplies.

Whatever type of first-aid kit is used, there should always be a reserve stock of supplies on hand in the office for replenishing it.

Supplementary First-Aid Equipment

It is highly desirable that a few additional items of equipment should be provided, preferably in close proximity to the first-aid kit. It should be possible for almost any plant to provide the following:

Basin with running hot and cold water
Chair or stool
Filing case for medical records
Liquid soap in a dispenser
Paper towels
Sanitary can with a cover
Stretcher
Table or desk on which records may be kept and reports filled out
Two woolen blankets
Bulletin board giving the following information:

a—Name and telephone of doctor or nurse on call

b—Panel of neighborhood doctors with telephone numbers to be consulted if (a) cannot be reached

c—Name and telephone number of nearest hospital

d—Name of worker in plant responsible for first aid, and name of his assistant

e—In States where the worker is entitled to free choice of his own physician, a notice to that effect should be posted.

Large poster to call attention to the need for cleanliness in giving first aid; for cleanliness of the first-aid kit; that nothing taken out should be replaced, and similar information.

First-aid manual giving first-aid procedures attached to the table so that it cannot be removed.

Inspection of First-Aid Kit

Regular inspection of the contents and condition of the first-aid kit should be done routinely at least once a week by the person who has been designated to give first aid when needed.

There should be a complete inventory on file in the office so that the weekly inspection may insure that the kit is completely supplied, and that a sufficient reserve of supplies is always on hand.

If the first-aid kit is attached to the wall, its attachments should be inspected to insure stability, so that the person who opens it is not met with a shower of bandages and glassware.

No one should be permitted to open the first-aid kit except those specifically in charge. *It should, however, never be locked.*

The first-aid attendant

The most elaborate first-aid equipment is valueless if a properly qualified first-aid attendant is not available at all times to render first-aid treatment. In selecting a person to take charge of first-aid work, the employer should attempt to find someone who is intelligent, firm, tactful, observant, resourceful, sympathetic, explicit and dependable.

Training

Courses of training in first-aid work are easily available through all local Chapters of the American Red Cross. In every plant some one or two workers can be found who, if encouraged, would take a regular course in first aid and be prepared to handle cases in accordance with accepted principles.

Duties

The principles of first-aid care for the injured are authoritatively presented in two manuals, either of which may be used as a standard guide. They are the American Red Cross First Aid Text Book and the Manual of First-Aid Instruction of the United States Bureau of Mines.

In addition to care of the injured there are certain general duties the first-aid attendant should assume. These may be listed as follows:

1—Responsibility for the contents of the first-aid kit (completeness and freshness of supplies)

2—Promotion of safety propaganda and repeated emphasis on the importance of first-aid treatment for minor as well as major injuries

3—Keeping of accurate records of all first-aid treatments rendered

Limitations to Functions of First-Aid Attendant

The attendant must realize that his job is first aid, and only first aid. Any tendency to assume responsibility for anything but first-

aid treatment should be discouraged. The injured person should be placed under the care of a physician at the earliest possible moment. Specifically, first-aid attendants should *not* attempt to:

1—Clean serious wounds
2—Set fractured bones
3—Remove foreign bodies (especially from the eye)
4—Administer drugs except in the most urgent emergency

It should be remembered that under the Medical Practice Act of New York State, it is illegal for anyone but a duly licensed physician to render treatment except in an emergency. It should also be realized that doing the wrong thing may be more harmful to an injured person than doing nothing at all.

Medical Personnel for Small Plants

Part-time nurse and physician

Although in the majority of small plants medical personnel is limited to individuals trained in first-aid work, the possibility of securing the services of a part-time nurse should not be overlooked, particularly where a part-time nursing agency is available. Such a nurse may make a real contribution to the health program of a small plant particularly if she has received some training in industrial hygiene.

Most small plants have physicians "on call" only. It is highly desirable even for physicians giving such limited service to familiarize themselves with the plant and with its possible health hazards so that they may be able to contribute to the development of a preventive program.

Group medical service

One method of arranging for the services of medical personnel, including physicians, for the small plant is through a cooperative group effort. A number of industrial plants situated in the same locality may pool their resources for the establishment of a joint medical service. The physician or physicians who provide their services to such a group then set up a central clinic reasonably accessible to all participants in the scheme. In New York State, the law requires the licensing of such clinics or "Medical Bureaus," the license depending on compliance with certain requirements. The field of industrial medical service for small plants is one in which there is a growing demand. Since cooperative action may be slow and difficult to achieve, it would seem that here is an opportunity for the exercise of initiative on the part of individual doctors interested in industrial work. Such physicians having hospital affiliations, well-equipped offices, and a knowledge of industrial hygiene can offer their services to a group of plants of their own choosing and so develop a satisfactory part-time medical service for a number of establishments. In addition to first-aid treatment, physicians working for a group of plants should make periodic visits to the

plants, periodically examine employees, institute measures for the control of health hazards, and, in general, furnish the same sort of medical service as might be found in a large establishment at a fraction of the cost to each individual plant.

No physician who undertakes such an enterprise should attempt to include a greater number of establishments than he can conscientiously care for. *His continued familiarity with actual working conditions in the plant is a requisite for effective service.*

Accident and Occupational Disease Prevention

Role of physician and nurse

In addition to the provision of adequate first-aid care and part-time medical services, small plants also must recognize the necessity of positive efforts to prevent accidents and occupational diseases.

The greater prevalence of lost-time accidents in small than in large plants has already been mentioned. There are no available statistics on the relative occurrence of occupational diseases according to plant size, but it is a fairly safe assumption that the situation in this respect is similar to that for accidents.

The duties of the part-time nurse and physician should include a complete appraisal of hygiene and safety in the small plant. Similarly a cooperative medical service, whether it be furnished by a group of physicians at the instigation of a group of plants, or by a physician acting on his own initiative, cannot be considered satisfactory unless it covers general plant hygiene and the prevention of occupational diseases as well as first-aid treatment.

Physicians offering service to industrial groups would do well to work in association with chemists and engineers to whom the plant may turn for technical advice.

Assistance from agencies outside plant

There are a number of agencies, both governmental and private, to which a small plant may turn, at no expense, for assistance and advice along the lines of accident and occupational disease prevention.

Services of New York State Labor Department

For the prevention of occupational diseases, plant surveys are necessary to indicate the type and severity of the hazard. The Division of Industrial Hygiene of the New York State Labor Department is prepared to put its technical staff, comprising doctors, chemists and engineers, without charge, at the disposal of any plant which desires to avail itself of these services. It is prepared to:

1—Make complete industrial hygiene surveys of plants when necessary

2—Make physical examinations of the workers

3—Take x-ray pictures of the lungs of workers in dusty trades

4—Make such dust counts or chemical air analyses as are necessary to determine whether a health hazard is present or not

5—Advise how accident or occupational disease hazards may best be prevented

If the Division of Industrial Hygiene is called upon to make a plant survey, the plant "safety-man" should use the opportunity to inform himself of the hazards present, the early symptoms of their effects and how exposure may be controlled.

Figure 2—Making an Industrial Hygiene Survey

Use of Nordlander apparatus for the determination of mercury vapor in workrooms

Full cooperation with the State Factory Inspectors who make recommendations in regard to safe practices on their periodic inspections will minimize accidents. The "safety-man" should make it a point to accompany State Inspectors on their visits to inform himself of proper safety techniques.

Other agencies

There are also other agencies which would gladly cooperate with the small plant for the prevention of occupational diseases and accidents, if called upon to do so. In addition to the Labor Department, already mentioned, there are the insurance companies, local and national safety councils, medical societies, manufacturers' associations, and some of the universities or foundations which are especially interested in these problems.

Small plants have not, in the past, sufficiently availed themselves of these opportunities.

Worker education in small plants

Personal approach

In small plants, workers can best be educated to a feeling of responsibility for their own part in the safety program by personal contact and explanation. Here the foreman's attitude can play an important part. The man responsible for the first-aid work must also constantly drive home to the other workers the need for first-aid treatment for even minor cuts and scratches. Posters or such reminders as the "Safety Instruction Cards" published by the National Safety Council[9] are helpful educational aids. It must be realized that *upon the education of the workers in the desirability of attending to minor injuries, more than on anything else, depends the much needed reduction in lost-time accident frequency rates of small plants.*

First-aid men or foremen can also act as *safety committees of one* to instruct workers in the proper use and adjustment of guards, exhaust apparatus, respirators, etc. By such an individual's approach, his explanations, his care and interest, more can be accomplished than by formal talks or the distribution of leaflets.

Educational literature

Literature on the subject of health and safety is useful in conjunction with more personal efforts and can be obtained from various sources, such as the National Safety Council, already mentioned, the Division of Industrial Hygiene of the New York State Labor Department, the United States Public Health Service,[10] and the Division of Labor Standards of the Federal Department of Labor, Washington, D. C.[11]

MEDICAL SERVICE IN LARGE ESTABLISHMENTS

FEATURES OF AN ADEQUATE MEDICAL SERVICE

In plants large enough to provide more than a simple first-aid kit, all manner of variations in medical services are found, depending on the number of employees, the type of industry, and the intended scope of the medical program.

According to the American College of Surgeons[1] an adequate industrial medical service for larger establishments should include the following features:

1—A definitely organized plan for the medical service

2—A definitely designated staff of qualified physicians and/or surgeons, nurses and attendants

3—Adequate emergency, dispensary and hospital facilities

4—Preemployment and periodic physical examinations—to be made only by qualified medical examiners*

5—Efficient care of all industrial injuries and occupational diseases

6—First-aid treatment and advice for employees suffering from non-industrial injuries and illnesses while on duty (For further professional care such employees should be referred to their family physician)

7—Education of the employee in accident prevention and personal hygiene

8—Elimination or control of all health hazards

9—Adequate medical records (accessibly filed in the medical department under responsible medical supervision)

10—Supervision of plant sanitation and all health measures for employees by the physician or surgeon in charge

11—An ethical and cooperative relationship with the family physician

12—The use of approved hospitals

Relation of medical department to plant management

The smooth functioning of the medical department will be greatly facilitated if it is in charge of a medical director who is responsible only to a major official of the company. This gives the department necessary authority and responsibility.

The assistant plant physicians, nurses and medical consultants should be selected by the director, and the medical service as a whole correlated and supervised by him. Close cooperation between

* These should be primarily for placement purposes.

the plant management and the medical director is necessary in formulating the program for medical services. The *employment office* and the medical department should work closely together to facilitate the placement of workers in positions for which they are best suited, and an equally close degree of cooperation between medical director and *production manager* is desirable for the satisfactory development of an accident and occupational disease prevention program.

Though the features of an adequate medical service as outlined may seem extensive, and suitable only for a very large establishment, analysis of these functions will show that the basic elements can actually be carried out by a relatively small unit composed, possibly, of only a nurse and a part-time physician provided that the service is intelligently planned and executed with interest and attention to detail.

FUNDAMENTAL PRINCIPLES OF MEDICAL "SET-UP"

Whether the staff comprises two or 20, certain fundamental principles are applicable to all medical "set-ups." These will be considered below under the categories of (1) the Medical Plant, (2) the Medical Personnel, and (3) the Medical Program.

The Medical Plant

Location

In considering where to locate the medical department, whether it is to consist of one room or many, the following requirements should be met:

1—*It should have access to good natural light and ventilation.* Not only is natural light necessary for the examining physician, but it produces a better psychological impression.

2—*There should be freedom from noise and vibration.* Aside from the anomaly of noise and tumult in connection with medical services, the use of the stethoscope is seriously handicapped if surroundings are not quiet.

3—*It should be located in a place of the greatest accessibility to the greatest number.* Many a minor cut has developed a complicating infection because, at the moment of its occurrence, it seemed too much trouble to go all the way to the dispensary.

4—It is also desirable that the medical unit be situated near existing toilet facilities unless they are to be included in it.

5—Allowance for expansion should also be made—especially if the unit is small. As the benefits of medical service become evident it is more than likely that additional space will be needed to permit growth.

Appearance and atmosphere

Whatever its size, the quarters occupied by the medical department should be painted in light colors and kept scrupulously clean and shining. Appearance is of great importance in producing the

desired favorable and cooperative psychological reaction to medical care. The physical temperature should be comfortablly warm in cold weather and the personal atmosphere one of friendliness and interest.

Size and arrangement

The One-Room Dispensary

The next development in medical facilities after the first-aid kit is the one-room first-aid room, or dispensary, which must needs answer all purposes. While such a room is a great improvement over the isolated first-aid kit, it should be realized that it does not offer the most satisfactory working arrangement. Since, however, one-room dispensaries are likely to outnumber larger units, the equipment and general arrangement will be dealt with in some detail.

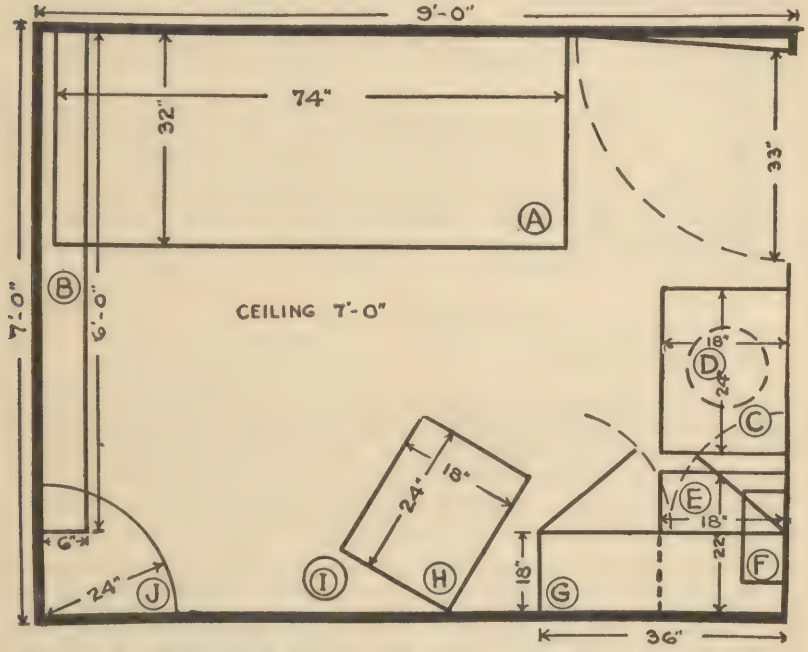

Figure 3—Suggested Lay-Out for First-Aid Room in Confined Space

A—Hospital cot
B—Stretcher—hung on wall brackets 6 feet above floor
C—Writing table—to fold up to wall
D—Stool
E—Porcelain top table
F—Sterilizer—mounted on wall
G—Medicine cabinet—4 feet 7 inches from floor
H—Headrest chair with folding armrest
I—Gooseneck lamp stand
J—Corner lavatory

Such a room can be small and simple. If possible, a nurse should be in charge, even if only on a part-time basis. However, if this is not feasible and if the medical services are not to be extended beyond those described for small plants, it could be in charge of the "first-aid man." A sketch of a first-aid room of minimal size is shown in Figure 3. A thin partition or screen is useful in dividing the room into two parts: A waiting room and a treatment room.

Equipment—This will vary with the size and needs of the particular plant, but should include at least the items listed on pages 6–7 for the first-aid kit and supplementary material as well as the following items:

Basin with running hot and cold water
Floor lamp
Instrument cabinet
Linen and blankets
One or two beds or cots
Scales
Small sterilizer
Telephone
Treatment table

Small office and surgical equipment, such as basins, pitcher, rubber gloves (sterile), scissors, tweezers, forceps, hot-water bottle, ice bag, etc.

Special equipment may be needed in some plants for special conditions. For example, for the resuscitiation of workers exposed to asphyxiant gases, one should have available an inhalator with a tank of 7 per cent carbon dioxide and 93 per cent oxygen.

Appendix A contains suggestions for an industrial dispensary drawn up by the Committee on Healthful Working Conditions of the National Association of Manufacturers.

The Three-Room Dispensary With Rest Room

A more satisfactory arrangement than the one-room dispensary is the three-room unit, consisting of a waiting room, a treatment room and a room for consultation, or for making physical examinations to which, when there are many women employees, a rest room may be added. Other rooms for special purposes may be arranged later to suit the needs and size of the company.

The waiting room—This need not be large if the return visits are distributed throughout the day so as to prevent congestion. Arrangements should be made for the separation of men and women, and injured workmen should be segregated, so far as possible, from those waiting for physical examinations.

The waiting room should be furnished with suitable seating accommodations for the number expected, with desk and chair for the nurse, and, very important, with filing cabinets for records.

The examination room—The examining room requires comparatively little in the way of equipment and can be quite small. Access to daylight is desirable, though this is not absolutely necessary. Its furniture should consist of a desk and chair for the examining physician, a revolving stool and an examining table.

Aside from this, the only other equipment is that necessary for examinations, much of which may by preference be supplied, or at least chosen, by the physician himself. The following items are suggested:

Dynamometer
Eye chart
Finger cots
Flesh pencil
Head mirror and light
Hemoglobinometer
Laryngeal mirror
Nasal speculum
Opthalmo-otoscope
Percussion hammer
Scales
Sphygmanometer
Spot light
Stethoscope
Thermometer (in sterilizing solution)
Tongue depressors
Tuning fork
Wassermann tubes

The treatment room—The guiding principle in deciding upon the equipment of the treatment room should be to remember that *its purpose is primarily for the treatment of minor injuries.* Employees with major injuries should be removed without delay to nearby hospitals. Occasionally, in isolated localities, of course, the industrial establishment must maintain its own hospital, but this situation is exceptional and is not within the scope of the present article.

In general the following recommendations are made for the surgical treatment room:

Size—It should be large enough to treat more than one worker at a time and when volume of work is sufficient, each type of injury, such as hand, leg, eye injuries, etc., should have its special place and facilities.

Equipment—It should contain the following furniture:

Desk to record all treatments
Flat-top examining and operating table for cases requiring the recumbent position
Separate eye treatment table with its own solutions and instruments
Sterilizer, cabinets and locker space for supplies
Suitable arm and leg rest chairs adjacent to treatment tables equipped with the necessary supplies and instruments

The following instruments and supplies are recommended by the Council on Industrial Health of the Amercian Medical Association[4]:

Adhesive plaster
Assorted bandages
Assorted catheters
Assorted gauze dressings
Assorted hypodermic needles
Assorted jars and basins
Assorted splints
Assorted surgeons' needles
Assorted sutures
Bandage scissors
Cotton
Crutches
Hand magnifying glass
Head mirror
Hemostatic forceps
Hot water bottle
Ice cap
Iris scissors
Loupe
Needle holder
Safety razor, blades
Scalpels
Splinter forceps
Surgical scissors
Syringes
Test tubes
Tissue forceps
Tourniquet

In the case of both treament and examination rooms, it is convenient and time-saving to arrange small dressing booths which

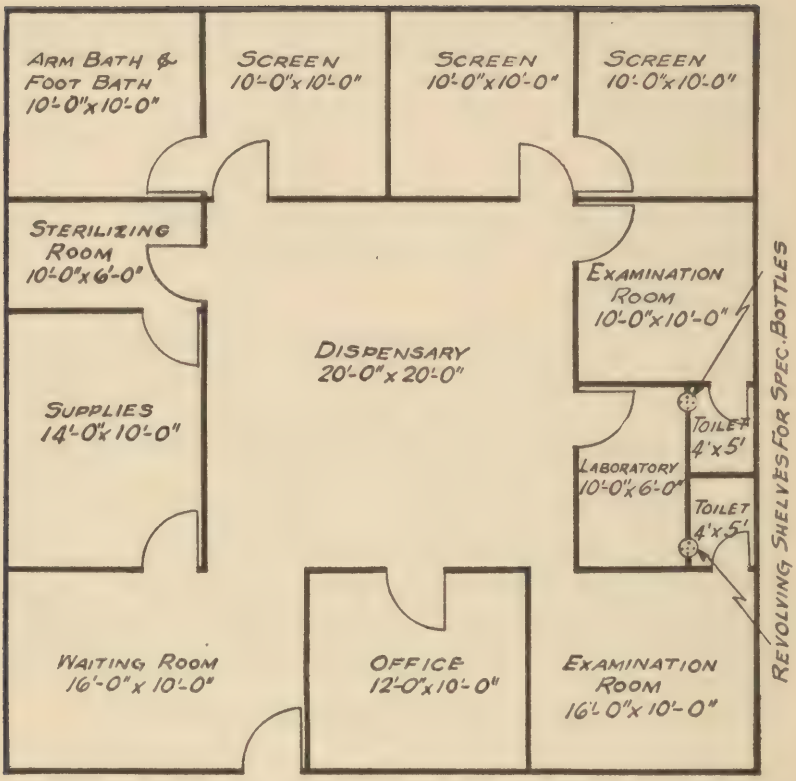

Figure 4—A Compact Arrangement for an Industrial Medical Unit

Source: Council on Industrial Health, American Medical Association.[4]

open into the waiting room on one side and the examination or treatment room on the other. In planning the dispensary, the arrangement of suitable storage space for supplies must not be forgotten.

Figure 4 shows a layout for an industrial medical unit in a plant of moderate size suggested by the Council on Industrial Health of the American Medical Association.[4] This unit emphasizes dispensary service and minor surgery.

Additional Facilities in a Large-Scale Medical Unit

Many additional facilities may be furnished in large industrial plants when the medical department extends its scope beyond physical examinations and first-aid treatments. Particularly useful are the following:

A *clinical laboratory* for blood, urine and serological examinations is comparatively simple to set up and economical of both time and money, where these tests are included as part of the physical examination.

An *x-ray department* may be very valuable in plants where fractures are not uncommon, or in industries having a silicosis or other dust hazard.

A *physio-therapy department* where injured workmen can receive suitable treatment along these lines can render useful service in shortening the period of disability.

A *department for dental prophylaxis plays* an important part in a preventive health program by forestalling unnecessary disability due to dental conditions.

An *eye department* for complete examination of the eyes particularly where work may entail special eye strain.

Medical Personnel

The physician

The demands of factory medical service call for certain special qualifications in the physician who is to undertake them, apart from good training and clinical ability. Perhaps the most important of these is what might be described as the "public health point of view." His interest must be in *prevention* fully as much as in treatment. He has not only individuals but, in a true sense, a community under his care and his concern must extend to all circumstances and situations within the community which touch upon its health.

Qualifications for Industrial Work

The detailed kinds of knowledge, experience and aptitudes which should be his have been drawn up by the American College of Surgeons [1] as follows:

1—He should be a graduate of an accredited medical school and licensed to practice in the state or province.

2—He should have at least one year's interneship in an accredited hospital.

3—He should have some experience in general practice either prior or supplemental to his duties at the plant.

4—He should have a general knowledge of industrial relations, including employment methods and problems, transportation, housing, recreation, educational facilities and methods and employees' benefit plans.

5—He should be qualified to determine by examination of employees their physical and mental fitness for work.

6—He should have a knowledge of the ingredients and of the toxic or disease producing qualities of all the materials and processes used in the industrial organization which he serves.

7—He should have a knowledge of sanitation, of working conditions, of accident and occupational disease prevention methods and of preventive health measures in general.

8—He should have a knowledge of the diagnosis and treatment of occupational diseases.

9—He should be competent in the diagnosis and handling of all traumatic lesions which he undertakes to treat.

10—He should be versed in procedure for follow-up and rehabilitation.

11—He should have a knowledge of the workmen's compensation laws.

12—He should have knowledge of an efficient medical record system and of statistical methods.

13—He should have an unbiased industrial viewpoint and a confidence-inspiring personality.

14—He should realize that his first duty should always be to the workman whom he examines or treats.

15—He should like people.

Time Spent at Plant

Whether or not the physician spends full time at the plant will depend upon the size and complexity of the medical department. Full-time medical directors are found in increasing numbers in establishments of 1,000 employees or more. In such cases it is advisable to have additional members of the staff who are engaged in private practice which keeps them abreast of the times in medical knowledge. The full-time industrial medical man without such associates and without outside contacts is apt to become "stale" and lose touch with progressive trends in his field.

A doctor who spends only part of his time in the plant either by making visits each day or visits at regular times during the week can exercise satisfactory supervision of the medical department providing he has a competent nurse in charge during his absence. This is the most satisfactory set-up for the smaller plant.

It is not satisfactory to put the physician on a call basis only since this means that his contacts with the plant are limited to emergencies. On such a plan, he has no opportunity to become sufficiently acquainted with the actual working conditions of the plant to be able to develop a constructive, preventive health program, or be given responsibility for health maintenance.

The nurse

Not less than the doctor, the industrial nurse must be an exceptional individual. She should be, of course, well trained—a woman with executive ability, keen interest in preventive work, and considerable tact; a woman who is not afraid of responsibility; who enjoys association with people and knows how to get on with them.

There is probably no field of nursing activity which is broader in its demands or more constructive in its activities than that of industrial nursing when the policy of the management is favorable to a far-sighted program. When it is not, the nurse and physician together with patience and persistence should try to convert the management to a broader point of view. This can often be accomplished by simple demonstrations with a very limited set of problems.

Qualifications

The National Organization for Public Health Nursing,[12] an authority on standards of nursing education and training, has formulated the following qualifications for the industrial nurse:

I—For the nurse in an industry which provides supervision by a qualified nurse supervisor:

A—High-school graduation or its educational equivalent is essential. More advanced education on a college level is desirable. Ability to use the typewriter and perform other clerical procedures is helpful to the nurse, especially in smaller industries where clerical assistance is limited.

B—Fundamental nursing education—The following are essential:

1—Graduation from a school of nursing accredited by the State Board of Nurse Examiners and connected with a hospital having a daily average of 100 patients, or a minimum of 50 patients with one or more affiliations affording supplementary preparation.

(a) Instruction and experience in the care of men, women, and children, including patients with communicable disease.

(b) Thorough instruction and experience in surgical nursing, including operating room and first aid. Instruction and experience are desirable in the following: (1) Outpatient department, especially in the emergency room. (2) Psychiatric nursing.

(c) State registration

II—For the nurse in an industry working without the guidance of a nursing supervisor:

This nurse should be able to plan the nursing program under the general direction of the medical officer and should have a working knowledge of the principles of teaching, social case work, community organization and resources, public health administration, industrial relations, personnel administration, industrial hazards, nutrition, communicable disease, mental hygiene, and personal hygiene, as they affect the individual and his family.

A—All of the preparation listed above under I and in addition:

1—At least one year of experience under qualified nursing supervision in a public health nursing service in which practice in the application of the above can be secured.

2—An academic year of study in public health nursing in one of the colleges or universities whose program is approved by the National Organization of Public Health Nurses.

(a) Where courses in industrial hygiene and safety are available.

(b) Where courses in principles of public health nursing, mental hygiene, social work, preventive medicine, and allied subjects are made applicable to nursing in industry.

(c) Where field work includes some experience in industry.

3—Supplementary experience and instruction in operating-room and first-aid nursing, if thorough preparation was not included in the basic nursing education period.

III—For the nurse in a supervisory position—All the preparation under I and II, and in addition:

Successful experience in industrial nursing, part of which is preferably in the type of industrial work in which the nurse is to act as supervisor.

The above, of course, represents the ideal in qualifications. Many nurses in industry unquestionably carry on their work efficiently

without extensive additional training, especially when endowed with energy and the preventive point of view. The desirability, however, for the prospective industrial nurse, of some special experience in the public health field and some knowledge of the principles of industrial hygiene will be apparent from a consideration of her duties.

Duties

The following is a list of duties and activities * of the nurse in industry:

1—*Management of dispensary*—This includes responsibility for the running of the medical department and supervision of equipment, supplies, procedures and records.

2—*First aid*—The industrial nurse should be responsible for first-aid treatment in the dispensary, in the absence of the plant physician. At such times she should act on standing orders given by the plant physician. She should also supervise first-aid kits and supplies throughout the plant and may well take on the training of employees in first-aid work.

3—*Assistance to plant physician*—The amount of aid rendered by the nurse to the plant physician will largely depend upon the wishes of the latter. The nurse will naturally assist the physician with treatments or dressings when necessary. She can facilitate the making of preemployment and periodic examinations by undertaking, subject to the physician's approval, such duties as history taking, vision and hearing tests, examinations of blood and urine, measurement of blood pressure, and assistance in the making of x-ray examinations.

4—*Follow-up of abnormal conditions*—Much of the benefit of preemployment or periodic physical examinations is lost if the correctable physical defects uncovered by such examinations are not corrected as soon as possible. The industrial nurse can play a vital part in the medical program by following up individuals to find out whether defects have received attention by the family physician and if not, striving to bring about correction by persuasion, education, and assistance in referring the individual in question to the proper physician, dentist or clinic. She is also in a uniquely favorable position to recognize evidence of the effects of any special occupational disease hazards. For example, when a worker in a lead department comes to the plant dispensary for first-aid treatment, a nurse, alert to the possible hazard, may by appropriate questioning discover early evidence of lead poisoning. The same approach pertains to exposure to silica dust, volatile solvents or other injurious substances.

* Largely taken from an outline on the subject in *Public Health Nursing* for January 1942.

5—*Health and safety education*—The plant nurse in her daily contacts with industrial workers, if she is interested, can accomplish more toward their education in matters of health and safety than can often be achieved by more formal efforts. She can, moreover, play a valuable part in an educational program by giving talks on health, distributing leaflets, and arranging for movies or other health demonstrations.

6—*Supervision of plant sanitation*—Supervision of plant sanitation, general cleanliness and good housekeeping, proper maintenance of toilet and washing facilities, provision of drinking water, etc., falls properly and naturally within the province of the industrial nurse. She should be given the duty of making routine plant inspections and reporting infringements of proper sanitation to the management for correction.

7.—*Safety program participation*—A well developed safety program includes regular conferences of foremen, safety personnel and representatives of the plant management to discuss causes and prevention of accidents. The industrial nurse can make a useful contribution to such conferences through her knowledge, gained from intimate personal contact in the medical department, of personal factors which might have played a part in accident causation in any given case.

8—*Supervision of plant lunch rooms and nutrition program*—The graduate nurse has received instruction in nutrition as part of her training. This knowledge can be put to good use in planning menus, and corrective diets for overweight and underweight individuals in plants which provide cafeterias but do not employ a dietitian.

9—*Coordination of medical department with other services*—Within the complicated structure of a large industrial plant the activities of the medical department require coordination with other departments and services, especially the safety department, and the personnel and placing department. Such coordination falls naturally within the sphere of activities of the industrial nurse.

Outside the plant as well, she finds a similar role to play in coordinating the work of her medical department with the various social agencies within the community. In this category would lie such duties as referring employees to outside physicians with a letter describing the need for treatment, and cooperation with local agencies to secure rehabilitation of sick or injured employees.

10—*Record keeping*—The keeping of good records is essential to the efficiency of the industrial dispensary (see section on records) and the industrial nurse is the one who must take full responsibility for them. Not only accident records which are required for compensation purposes, but also medical records

should be kept; the latter including all dispensary visits and reasons for absenteeism as well as records of preemployment and periodic physical examinations.

11—*Visiting nursing service*—In addition to the duties described above, industrial nurses, in many large plants, participate in a visiting nursing service. Where such a service has been established, it is usually the practice for a plant nurse to visit employees who have been absent for longer than a given time, usually three days. If this feature is carried out as a true service, and not merely for the purpose of obtaining information, it will be found very acceptable. The visiting nurse is able to be helpful in many ways. She can judge whether the physician is needed when he has not been called; or whether his instructions are being properly carried out. When some other disposition of the case is indicatd, she can suggest it. If difficult household problems complicate the situation, she can put her knowledge of existing social service agencies to use in helping with their solution.

It is possible and often very satisfactory for a plant which is not large enough to maintain its own visiting service to arrange with the local visiting nurse association for visits to be made to its sick employees. Any scheme of visiting service presupposes that the medical department will be informed daily, from the plant, of absences in the various departments.

The Medical Program

The medical program in industrial work may be thought of as having two functions, the first, *remedial*, expressed in treatment for minor non-occupational accidents and illnesses and all occupational conditions; and the second, *preventive*. Of the two, the preventive function in industry is the more important from the long range point of view.

Treatment

The principles of treatment for minor accidents and illnesses need no elaboration here. They are the accepted ones of medicine and surgery, well understood by any competent medical staff.

Relationship to Private Physicians

In the course of carrying out its treatment functions, however, the industrial medical department will necessarily be brought into relationship with private practitioners. Great care should be taken to preserve the ethical requirements of this situation and in non-occupational conditions to refer employees to their own physicians except for temporary first-aid measures. The need of consultation with the employee's own physician may often, in fact, be brought to his attention by the plant medical department when it might otherwise have escaped his realization.

In compensation cases, the question of the follow-up treatment of occupational accidents and diseases, after first aid has been given, arises. In New York the employee is by law entitled to choose his own physician from among those who are licensed to treat compensation cases. He is likely, of course, to be quite willing to rely on the plant medical department if this has already won his confidence, but in such cases his right of free choice should be explained and he should sign a statement indicating that he has elected to receive treatment from the employer's physician.

The preventive program

The second or preventive function of the industrial medical program may be thought of as comprising the following activities:

a—Physical examinations, both before employment and periodically thereafter

b—Special measures for health maintenance

c—Elimination or control of occupational hazards

d—Health education

Physical Examinations

The keystone of the preventive medical program is the examination of the worker, first, before employment, to appraise his physical condition in terms of his prospective job; second, after employment, to note whether defects previously found have been corrected; and third, to discover any changes which may have occurred in the course of time which, unrecognized and uncorrected, might lead to disability. These three purposes are achieved through the pre-placement, follow-up, and periodic medical examinations.

The pre-placement examination—

Benefit to Employees—The physical examination before placement is a logical and necessary part of a constructive industrial health program. The advantages to the employer are obvious and are usually the ones stressed. The advantages to the employee of pre-placement examinations, however, are equal or even greater than the advantages to the employer. By means of a pre-placement physical examination he is:

1—Protected from injury from a job for which he is not fitted—which may happen, for example, when men with unrecognized hernias or cardiac disease are engaged in heavy labor.

2—Protected from possible contagion from fellow employees, for example, when a worker with active tuberculosis is accepted for employment in a crowded department.

3—Informed of minor physical defects. Even where defects exist which are too insignificant to influence employment it is of distinct advantage for the worker to be made aware of them. In this way they can be corrected and thus, perhaps, avoid serious trouble at some later date.

Rejection Rate—The advantage of pre-placement examinations to the prospective employee has not been appreciated because of the fear that they would be used unfairly to refuse employment or

that unreasonably high physical standards would be set, resulting in arbitrary rejection of able workers. As a matter of fact, the percentage of rejections found in the National Association of Manufacturers' survey [6] of industrial plants averaged only 4.4 per cent and in the present war emergency, is probably less than this. Industry in general, is coming more and more to accept the policy expressed by the medical director of a large steel manufacturing plant, namely that the reasons for rejecting a man should be limited to:

1—Those where he a danger to himself.
2—Where he is a danger to others.
3—Where he is a danger to the job.

A practice which commends itself to common sense is that of accepting people for employment who have readily correctable defects, such as bad teeth or infected tonsils with the understanding that the defects will be corrected within a certain time.

As a matter of fact, there is a growing tendency, as a result of the work of rehabilitation agencies and stimulated by the war emergency to recognize that even the individual with some serious uncorrectable defect, i.e., the man with one eye or one leg, the cardiac, etc., may function adequately in industry, provided he is properly placed.

Technique of Examination—The medical examiner can overcome much of the opposition to pre-placement examinations if the applicants are treated in an unbiased, professional manner with the same degree of interest and courtesy as would be displayed by the examining physician in his private office.

The examination procedure itself may be left to the judgment of the plant physician or medical staff. For those who would like guidance in this matter, a method for making pre-placement examinations, adopted by the New England Conference of Industrial Physicians [7] is shown in Appendix B(1) together with the physical examination procedure, Appendix B(2), recommended by the Conference Board of Physicians in Industry.[7] The physical examination form in use by the Industrial Commission of Wisconsin [13] which has officially approved the system of pre-placement examinations for all industrial workers is shown in Appendix C together with forms from several other sources.

The examination should be a complete one and should include a hemoglobin determination, urinalysis, serological blood test and x-ray examination of the chest. The latter is invaluable as a means of discovering early tuberculosis which may be present without any symptoms or signs.

Special examinations may be indicated in plants having special chemical hazards, for example, complete blood studies are desirable before placing a worker where he will be exposed to benzol; examination of blood for stippling and anemia, and of the urine for lead before lead exposure; neurological or psychiatric examinations before work with carbon disulfide; tests for liver function before exposure to chemicals which may damage the liver, etc.

It is obvious that to evaluate the work a prospective employee is best fitted for, the examining physician should have a thorough knowledge of plant operations and the possible hazards involved in them.

Standardization of Terminology—The Conference Board of Physicians in Industry [7] has rightly stressed the advisability of standardization of the terminology used to describe defects found in the physical examination of applicants and employees. Their recommended terminology to express degrees of defect due to specific conditions is shown in Appendix D.

Findings to Remain Confidential—It should be a cardinal principal with the medical department to keep its findings confidential. This is most important in promoting an attitude of cooperation on the part of the workers. It would seem advisable that reports from the medical department to the employment office should be made only in general terms, or in terms of some classification code —not in terms of the disabilities found, except where absolutely necessary for proper placement.

Classification on Basis of Physical Findings—A system of classification recomended by the American College of Surgeons [1] and used by many industrial physicians is the following:

Class A (or I)—Physically fit for any work

Class B (or II)—Physically underdeveloped or other correctable defect—otherwise fit for any work

Class C (or III)—Fit only for certain employment when approved and supervised by medical department

Class D (or IV)—Unfit for any employment

When the applicant's physical condition falls within Class C he must be considered in the light of the demands of the particular job. If the proposed work is not suitable, every effort should be made to find employment suited to his limitations. This is a social responsibility which industry must assume. If the applicant is placed in Class B or better, he may be considered suitable for employment at any type of work.

Criteria for Classification—In general, it is better to leave the question of what specific defects should determine the placement of an individual in Groups B, C, or D to the judgment of the examining physician, than to rely on any arbitrary list. Such a procedure leaves him free to judge each case in the light of his own clinical experience on its own merits, and gives the necessary flexibility to a procedure which should not be a yardstick for physical perfection, but rather a means of discovering what work is best suited to a given worker.

A physician, quoted by the National Safety Council[14] feels that applicants having the following defects *may be admitted* to most factories without undue risks, provided they are selectively placed and watched.

1—Hernia of long duration which is complete or well held by truss, provided the applicant has done similar work as that for which he is hired, for four weeks preceding.

Figure 5—Physician of Division of Industrial Hygiene of New York State Labor Department Examining Worker in a Plant Where Toxic Chemicals Are Handled

2—Varicose veins, provided ulcer and edema of ankles is absent.

3—Variococele, if supported by suspensory.

4—Flat feet with symptoms; that is, pain in foot when applicant walks on toes or pain in back on bending over.

5—Deafness, except in special departments.

6—Defective vision, depending upon hazard and department.

7—Arteriosclerosis.

8—Endocarditis, unaccompanied by myocarditis.

9—Arrested tuberculosis—in special departments.

Follow-up examinations—Where an individual, who has correctable defects, has been accepted for employment, *he should be scheduled for a follow-up examination,* after a suitable interval, to see whether the defects have been corrected. These follow-up examinations play a very important part in the general health program. By means of them, the faltering resolve of the worker to have a given condition corrected is bolstered; ways and means of having the matter attended to may be suggested to him, and ultimately both he and the medical department have the satisfaction of seeing him achieve the category of the physically fit.

Periodic health examinations—The value of periodic health examinations, regardless of any awareness of defect, has been established beyond question as a necessary part of a preventive health program, and is extremely valuable in *maintaining* the health of an industrial group.

Frequency—The length of time which should be permitted to elapse between examinations depends on the individual's age, the hazardousness of his occupation, and the defects shown on his initial examination. In general, for workers under 45, engaged in work without any occupational disease hazards, and who were free from defects when first examined, an interval of two years between examinations is permissable. For individuals over 45 an annual examination is advised. *For those exposed to any toxic substances examinations at intervals of one to six months,* depending on the nature of the exposure, are necessary.

Type of Examination—The examination should be a complete one, including an x-ray of the chest where there has been unexplained loss of weight or in the presence of a dust hazard, a urinalysis, and hemoglobin determination. Where there is exposure to toxic substances, routine urine analysis should, in some instances, be supplemented by chemical analysis to determine excretion. Special detailed blood examinations will also be necessary in cases of exposure to benzol or other substances which may damage the blood-forming organs. The form and procedure may be similar to that used for pre-placement examinations (see appendices B and C). The examinations should never be hurried. An attempt to save time may defeat their very purpose. Fifteen to 20 minutes should be the minimum examination period allocated for each person.

After the periodic examination, follow-up examinations for the correction of defects should again be scheduled as in the case of

pre-placement examinations. Among the unsuspected changes which the periodic physical examination might be expected to reveal are early active tuberculosis, anemia, dental carries, diabetes, defective vision, hypertension, nephritis, sinus infection, and *early evidences of intoxication by chemical substances before the worker realizes he is being injured.*

General Measures for Health Maintenance

It is only natural that the medical director who thinks of himself as a community health officer should also be interested in preventing as much sickness as possible which is not necessarily related to the working environment. Efforts along this line fall, naturally into the following groups:

1—The discovery and follow-up of physical defects to secure their correction

2—Measures to reduce respiratory disease

3—Attention to adequate nutrition

4—A syphilis control program

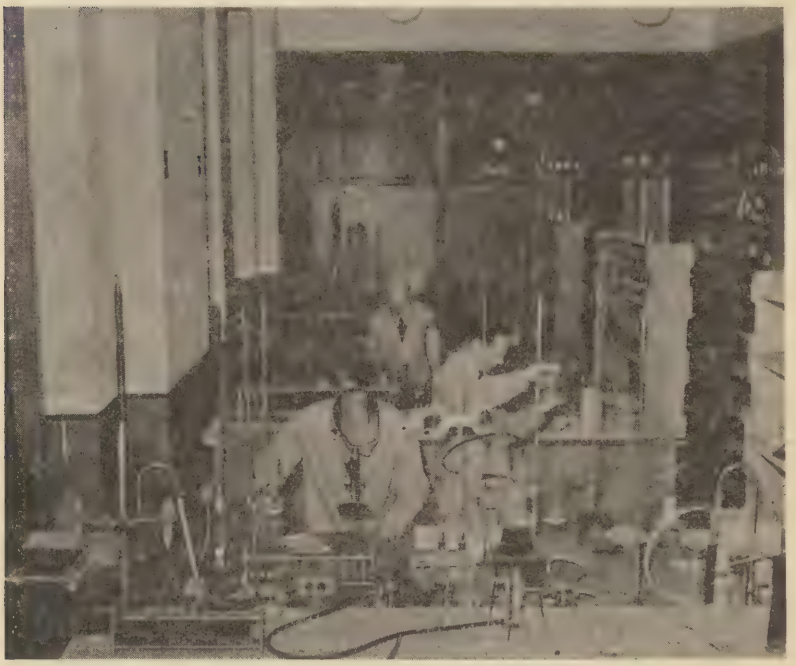

Figure 6—Chemists Analyzing Samples in the Laboratory of the Division of Industrial Hygiene, New York State Labor Department

Discovery and follow-up of physical defects for correction—This subject has already been discussed in connection with pre-placement and follow-up examinations. It is mentioned again simply to stress its important role among general measures for health maintenance. The first step toward the realization of the greatest attainable physical efficiency must be the elimination of the undermining influence of such correctable defects as poor teeth, infected tonsils, troublesome flat feet, defective eyesight, etc. The medical department which not only discovers such defects, but conscientiously follows through to their correction, has made great strides toward improving the physical status of its working force.

Measures to reduce respiratory disease—Studies show that by far the largest amount of sickness absenteeism in industry is caused by respiratory diseases. The United States Public Health Service has found that such diseases accounted for 41.8 per cent of the total disease incidence.

Analysis of causes of sickness absenteeism lasting more than two days among 19,500 cases occurring in the employees of a telephone and telegraph company[3] showed that respiratory diseases accounted for 48.5 per cent.

Such diseases also accounted for a very large proportion (37.4 per cent among men and 45.1 per cent among women) of the illnesses lasting for more than seven days (Table 3).

TABLE 3 — FREQUENCY OF COMMONEST MEDICAL DIAGNOSES, ACCORDING TO SEX, IN ILLNESSES OF MORE THAN SEVEN DAYS DURATION, AMONG EMPLOYEES OF A PUBLIC SERVICE CORPORATION

Type of illness	Men	Women
	Per cent	*Per cent*
Accidents off duty	7.9	10.9
Anemia	.....	1.5
Appendicitis	3.3	3.9
Arthritis	7.0	3.4
Gastro-intestinal	9.1	4.2
Genito-urinary	.....	4.4
Liver and gall-bladder	2.1	1.4
Mental and nervous	2.3	3.7
Miscellaneous	15.4	17.0
Skin	4.0	4.5
Upper respiratory	37.4	45.1

Source: Lynch.[3]

While the question of the precise effect of vaccines, vitamins, etc., on increasing resistance to colds is controversial, nevertheless sufficiently favorable results have been reported from their use in industry to warrant their trial by any interested medical director. Trial therapeutics along these lines with large groups of individuals such as are found in industry is needed in order to reach definite conclusions as to what may or may not be expected from such attempts at prevention.

Regardless of any immediate effect on the incidence of colds, the addition of vitamins to the diet is believed by experts in nutrition to have a beneficial effect upon the general health and, from this point of view, the practice of supplying vitamin preparations at cost to an industrial group has a logical place in a health-building program, though such a measure should be accompanied by education in the principles of a proper diet as well.

Attention to nutrition—Recognition of the relationship between proper food and physical fitness is of long standing, and the principles of scientific feeding have been applied to the breeding of prize-winning cattle, poultry, etc., for many years. Under the stress of the present emergency the importance of using this knowledge of nutritional principles to increase human efficiency and fitness is becoming clearer than ever before. The demands made upon industrial workers, in particular, require that attention to their diet be included in any comprehensive health program, particularly since studies such as those of Stiebling and Goodhart[15] have shown that the meals of industrial workers tend to be highly unsatisfactory from a nutritional standpoint. In Stiebling's study only 26 per cent of workers' families were classified as having good diets.

Where the plant is too small to provide a cafeteria and the workers must depend upon lunches brought from home or purchased at nearby restaurants, efforts should be made to guide and improve their eating habits by education. Where the plant provides cafeteria service every attempt should be made to provide the worker with a noon meal which includes the highest possible proportion of his daily nutritional requirements. Cafeterias and lunch stands should, if possible, be under plant management, on a non-profit basis, and in charge of a trained dietitian who can supervise menus.

Recommendations of the Food and Nutrition Board of the National Research Council[15] for each adult's daily consumption will be found in Appendix E.

Measures to improve the plant commissary should include the replacement of foods like candy, soft drinks, and highly milled, non-enriched cereal products such as white bread, pastries, etc., with milk, fresh fruit juices, fruit, vegetables and whole-grain or fortified cereals.

Wagons used in conveying mid-morning or mid-afternoon refreshments throughout plants should carry milk, fruit juice and fruit as well as candy and "pop." Colorful and attractive posters urging a wise choice of refreshments and explaining the reasons in favor of such a choice might well be attached to the wagons themselves.

Special attention to the needs of the markedly underweight and overweight individual is another valuable preventive activity of the industrial medical department. Both nutritional extremes are recognized as carrying definite health liabilities.

Syphilis control program—There is little evidence that syphilis is particularly an industrial problem, but the industrial medical

department is favorably placed to play an important part in syphilis control in its community. At the time of the pre-placement examination, a serological blood test should be made in all cases. Individuals showing a positive reaction should be informed and referred to an appropriate agency—their own physician or a suitable clinic for treatment with the understanding that, unless the disease is in a contagious phase, employment will be continued while treatment is carried on. Persistent "follow-ups" are of particular importance in these cases to confirm the fact that treatment is being conscientiously followed. Needless to say, the same care should be taken to preserve a confidential relationship in such cases as would be exercised in private practice.

There are certain types of work from which individuals with syphilis should be excluded because of a possible aggravating effect upon the disease. Exposure to lead and carbon monoxide is considered by some industrial hygienists to be particularly undesirable in these cases. In general, it would seem wise not to place such individuals during their period of treatment, in contact with any toxic substances.

Control of the Industrial Environment

It is in the field of the elimination or control of specific occupational hazards that the industrial medical department can play a vital role. Occupational hazards may be defined as those conditions present in an industrial environment which may have an unfavorable effect upon health. Occupational hazards may give rise, specifically, to accidents, occupational diseases, excessive fatigue, and undefined states of ill health, all having an unfavorable effect not only on the individual, but on his industrial production. It is the duty of the industrial medical department to do all it can to prevent the development of such conditions at any time. Under the present war emergency, to maintain efficient production becomes a patriotic necessity.

Accident prevention—

Relationship of Medical Department to Safety Program—It is unlikely that the medical department will have the chief responsibility for an accident prevention program, since this is usually developed by a plant safety committee or safety engineer, but it has a very important part to play in such a program. The medical department should be represented on the safety committee in the person of the physician himself or, if this is not feasible, the nurse.

Familiarity with Plant—The medical department can best play its part in accident prevention by its knowledge of the employee on the one hand and the job on the other. The doctor or nurse should, therefore, familiarize themselves thoroughly with all departments of the plant so that they are aware of possible accident hazards, i.e., which machines are potentiallly dangerous;

what operations involving handling material present accident possibilities; what floors are slippery, etc. Such familiarity can only be achieved by periodic inspections which might, to advantage, be made with the plant "safety man."

Investigation of Accidents—After an accident has occurred, the plant physician or nurse should sit in with the safety committee, studying how it came about. In this way they will come to have a better understanding of the factors which enter into accident causation. The knowledge so gained can be put to practical use in making employment recommendations after the pre-placement examinations. Not only physical but mental characteristics which might have a bearing on accident proneness must be taken into consideration in placing workers.

The plant physician, or nurse, who is aware of the demands of the various jobs can play a part in accident prevention in other ways. They have, for instance, a day-to-day knowledge of the fitness of the working force and can pass on to the foreman a recommendation that some particular worker who is temporarily not up to par, perhaps because of returning after illness, for example, be temporarily changed to less demanding work.

Attention to proper sanitation—The general sanitary condition of the plant falls within the sphere of interest of the industrial medical department because of its direct bearing upon health and well-being. Routine matters such as the question of adequate toilet and washing facilities, the cleanliness of workrooms, the presence of easily available drinking water, good general ventilation and satisfactory lighting—all have a bearing upon the health and well-being of the individuals who spend a large share of their lives in the plant environment.

Sanitary Requirements of the Labor Law [16]—In Appendix F will be found references to the sanitary requirements for factories in New York State. The plant physician and nurse should inform themselves of these requirements and make a point of finding out whether or not conditions in their plant conform satisfactorily to them.

Worthy of special attention are:

1—The prohibition against eating meals in workrooms where poisonous or injurious substances are present

2—The requirement that hot water, soap and individual towels be furnished in washrooms of factories where poisonous substances are handled

3—The requirements regarding seats for female employees

4—The requirement that physicians shall report all cases of industrial poisonings

Specific and technical requirements for certain industries in New York State will be found in the various Industrial Codes, a complete list of which is given in Appendix G.

The provisions of the Law relating to ventilation and lighting of workrooms are necessarily couched in general terms, but the plant physician should inform himself of good accepted practices and

satisfy himself that conditions in his plant meet such modern standards.

Ventilation—Proper ventilation which insures not only the removal of dusts and fumes where these are formed, but also a supply of fresh air of the proper temperature, is essential for efficient functioning of the human machine. In large establishments, *particularly when some form of air pollution is present, the services of a ventilating engineer are desirable—indeed, often necessary.* But in many simple situations a knowledge of what constitutes good ventilation and a concern to provide it will suffice without engineering guidance.

In the absence of specific air contaminants, certain helpful general principles to bear in mind for providing a pleasant and invigorating atmosphere are:[17]

> 1—The room should be as cool as is compatible with comfort.
>
> 2—There should be adequate air movement. During the winter season feelings of stuffiness are likely to arise if the air velocity is much below 20 feet per minute, and in summer higher velocities are required.
>
> 3—The air movement should be variable rather than uniform and monotonous. When windows are open the air movement is likely to be variable, but with mechanical ventilation systems air inlets should be so designed and the velocity of discharge so regulated that suitable eddying currents are set up.
>
> 4—The relative humidity of the air should be kept reasonably low, generally well below 70 per cent.
>
> 5—The average temperature of walls and other solid surroundings should not be appreciably lower than that of the air, and should rather be warmer.
>
> 6—The air at head level should not be distinctly warmer than that near the floor, and the heads of the occupants should not be exposed to excessive radiant heat.
>
> 7—The air should be free from objectionable odors.

Lighting—It is safe to assume that some form of illumination has preceded the establishment of the medical department in most industrial plants. Its adequacy should not be taken for granted however, but made the object of a special check-up because of the close relationship between insufficient lighting and eye-strain. The *amount of illumination* is measured by the light meter, a necessary piece of equipment for all industrial hygienists, including plant physicians.

Desirable intensity—Opinion as to the amount of illumination necessary for close work has changed considerably in the last 25 years. Formerly the desirable standard was set at three to four foot-candles but experiments have shown that 20 are necessary for optimum eye performance where work is comparable to that done in school or office and that illumination of 25 to 100 foot-candles may be necessary for fine work.[18]

In raising the intensity of illumination, care must be taken to avoid unpleasantly bright light sources in the field of view, causing an effect of glare, since the resulting eye fatigue would offset the

increased efficiency. Indirect glare due to light reflection from shiny surfaces should also be guarded against.

For a complete and detailed discussion of proper industrial lighting, with recommended minimum standards of illumination for various industrial situations and operations, reference is made to the publication of the Illuminating Engineering Society of New York, "Recommended Practice of Industrial Lighting".[18]

The Prevention of Excessive Fatigue

While a certain amount of fatigue is a normal accompaniment of any activity, it is generally admitted that in industrial work an excessive degree of fatigue may occur which is definitely detrimental to health and results in decreased production. Such fatigue is cumulative; recovery does not occur at the end of a normal rest period. This makes the individual who suffers from it depressed, irritable and discontented. Under conditions of greatly increasing production, such as pertain at the present time, fatigue, unless guarded against, may seriously undermine efficiency.

Concern for the prevention of excessive fatigue falls naturally in the domain of the medical department, though the cooperation of virtually all departments may be necessary to achieve this purpose. Upon the plant physician, however, falls the duty of pointing out situations where excessive fatigue is being unnecessarily caused. Very often comparatively simple changes may suffice to correct the condition.

Causes of undue fatigue in industrial work—The causes of fatigue, of an individual's not being at his best, are legion and the subject is too large for adequate treatment within the scope of this article. However, the more obvious and correctable causes, operating within the industrial environment are listed below:

- Poor health, including undernutrition
- Monotony
- Poor physical or psychological adaptation to job
- Excessive hours of work
- Irregular shifts
- Excessive speed, noise or vibration
- Excessive complexity or need for concentration
- Heavy lifting
- Defective posture
- Defective ventilation and lighting
- Inadequate space
- Inadequate food
- Inadequate sanitary facilities
- Extremes of temperature

To these items may be added two others, frequently present, which are not directly within the industrial environment, but to some extent under its influence, namely the necessity for traveling long distances to work in crowded conveyances and home worries of various kinds.

Preventive measures—It can be seen from the above list that the program for the elimination of unnecessary fatigue may cover a wide range of activities—all the way from the choice of properly

shaped seats to promote good posture, to the promotion of a housing development or the institution of a cafeteria, where prepared menus may help to make up for dietary inadequacies.

It is clear that a medical department which has properly carried out the functions already discussed, namely, proper choice of worker for his job by pre-placement examinations, careful attention to plant sanitation and the prevention of accidents and occupational disease hazards will already have gone far in its fatigue-prevention program.

Rest Periods—Under conditions pertaining in industry at the present time, it is probable that long working hours will have to be reckoned with as one of the chief causes of fatigue. It is impossible to define optimum working hours exactly since they differ under different conditions and for different types of work, but experience has shown that increasing the hours of work beyond a certain point does not result in correspondingly increased production, and excessively long hours must be considered generally undesirable. Where they cannot be avoided, the practice of introducing rest periods will be found helpful in avoiding excessive fatigue.

In this connection Dr. Parran, Surgeon-General of the U. S. Public Health Service, has made the following recommendations in regard to plants operating on a 24-hour basis:[19]

> "Organized rest periods help maintain production at a high level. Five to 15-minute rest periods should be provided at the end of the first quarter and again at the three-quarter mark of each shift. This is especially important in repetitive, monotonous work or heavy manual labor."

When rest periods are instituted they should be obligatory. How the period should best be spent depends on the type of work. Exercise is desirable with sedentary work; rest after active work. The practice of taking refreshments during rest periods adds to their fatigue-combating value and the traveling refreshment stand is a sound institution from the fatigue prevention point of view, especially when its contents have been chosen with a thought to their nutritive value.

Satisfactory Arrangement of Shifts—Many plants which formerly operated on a single shift have been obliged to adopt a multiple shift schedule to keep up necessary war production. Changing shifts introduces problems connected with adaptation to different working hours.

The body has a definite physiological rhythm as shown by temperature and pulse changes which has developed from its traditional pattern of activity during the day and sleep at night. When this is disturbed it takes several weeks to become adjusted to the new routine. If shift changes are made too frequently no satisfactory adaptation occurs and the worker may tend to be inefficient and sleepy at work, and wakeful when he should be asleep.

To overcome this effect, shift changes should be made infrequently, allowing workers to remain on the same shift for

several months at a time. A shift schedule has been developed by Dr. Nathaniel Kleitman of the University of Chicago and recommended by the Division of Labor Standards of the U. S. Department of Labor [20] which has several advantages. According to this schedule, shifts are arranged from noon to 8:00 P.M., from 8:00 P.M. to 4:00 A.M., and from 4:00 A.M. to noon. This arrangement entails a minimal displacement of the usual sleeping hours since no one would be compelled to sleep in the afternoon; furthermore, it would allow everyone an opportunity to enjoy some time out of doors during daylight. The shift changes under this schedule also fall at times which do not coincide with community rush hours.

Where industries find it necessary to have two 10-hour shifts Dr. Kleitman suggests an early shift from 4:00 or 5:00 A.M. to 2:00 or 3:00 P.M. and a late shift from 2:00 or 3:00 P.M. to midnight or 1:00 A.M. In this way no one would be obliged to work during the early morning hours of greatest inefficiency.

Noise Control—Constant exposure to noise is unconsciously tiring even though workers may seem to "get used" to it. Noise distracts attention and extra effort to counteract the distraction must be expended. Noise excites, irritates and leads to nervous tension. Though noise is unavoidable in many industries, simple changes in method can sometimes be made which will markedly diminish it. Such possibilities should always be investigated because of the resultant saving in nervous energy.

There are in general four principles to follow in a serious attempt to reduce excessive noise. These are

1—The isolation of a noisy machine or process

2—The use of sound-absorbing material on walls and ceilings of noisy rooms

3—The provision of smooth floor surfaces

4—Attention to machine maintenance

Very excessive noise such as results from pneumatic riveting, underground rock drilling, etc., constitutes a definite hazard to the hearing faculty. In such cases the auditory apparatus should be protected by special ear plugs.

Good Posture—Those who have made extensive studies of fatigue cite posture as an important determining factor. While very little can be done to re-educate a large working force whose posture habits are pre-formed, several measures can be taken which tend to bring about better posture in the course of the day's work. One of these is to arrange the height of working benches so as to minimize the amount of stooping required. Another is to supply chairs for those who sit at their work which are so shaped as to encourage good posture. Arrangement of seats at a height so that the individual can sit or stand at will is very helpful in the relief of fatigue due to the maintenance of a fixed position.

For a full description of a "correct posture" chair, and methods to improve posture at work, reference is made to *Special Bulletin No. 141 of the New York State Department of Labor.*[21]

Good Food—The importance of proper nutrition to the general health of workers has already been discussed. There is no doubt that a plant cafeteria where employees can buy, at cost, good, well-balanced meals, hot in cold weather, will diminish afternoon fatigue, as compared with the effect of a cold sandwich lunch eaten in the workroom, or a hasty trip home and back. Extra mid-morning and mid-afternoon refreshments, particularly when chosen with a view to their nutritional value, also relieve fatigue, such relief being demonstrable in certain cases by actual production curves.

Change of Job—In many cases elimination of fatigue in an individual case which might have been attributed to speed, monotony, or difficulty of an operation can be accomplished, not by a change in the process, but by a change of the job. Individual aptitudes vary greatly and a medical department which lends a sympathetic and intelligent ear to workers' complaints, in cooperation with a flexible employment policy can do much to ameliorate fatigue in individual cases by arranging for transfers to other jobs, without unnecessary interference with plant processes.

Solution of Home Difficulties—Sources of fatigue or worry operating in the individual's private life also must not be ignored, since they are often of paramount importance. Here the medical department can be of great indirect assistance in recommending solutions of personal problems, such as those of sick relatives, etc., with reference to the available social agencies.

Recreational Activities—Organized games and amusements of various sorts may be included among measures to combat mental fatigue or boredom and hence have a legitimate place in the industrial health program in plants large enough to include them.

Psychological Attitudes—A personnel and medical department which manages to create in the worker's mind the belief that he is important and valuable as an individual, and that his welfare is a matter of true concern to his employers, has established an atmosphere which, itself, will combat fatigue.

Various studies have shown that the development of a feeling of interest, a desire to cooperate,—an "esprit de corps" in short—may help increase production and minimize fatigue, as much, if not more, than changes in the physical environment.

The Prevention of Occupational Diseases

Responsibility for the prevention of occupational diseases should rest squarely on the shoulders of the plant medical department. Obviously the first step for the plant physician to take, then, is to familiarize himself with the causes of occupational disease in general.

Causes—The list of causes of occupational diseases in industrial life is a lengthy one. It is impossible, within the scope of this publication to discuss these hazards in detail, but for concise information about them, their effects, and the particular occupa-

tions in which they may operate *every industrial physician should provide himself with Bulletin No. 41 of the United States Department of Labor, Division of Labor Standards, entitled "Occupation Hazards and Diagnostic Signs—A Guide to Impairments to be Looked for in Hazardous Occupations."*[22] This is an exceedingly useful and informative publication.. .

The following classification of the causes of occupational disease is largely taken from the above reference:

A—Abnormalities of air pressure:
1—Increased pressure (caisson disease)
2—Decreased pressure (attitude sickness, aeroembolism, middle ear disturbances)
B—Abnormalities of temperature and humidity:
1—Heat (heat stroke, heat exhaustion, heat cramps)
2—Sudden variations of temperature (respiratory infections, neuralgic and rheumatic affections)
C—Dampness (respiratory, neuralgic and rheumatic affections)
D—Defective illumination (nystagmus, eye strain)
E—Dust:
1—Organic (irritation of skin and upper air passages, allergic effects)
2—Inorganic dust containing free silica (silicosis, silicotuberculosis)
3—Inorganic dust containing no free silica (fibrosis, may be incapacitating)
4—Asbestos (asbestosis)
F—Infections—when the occupation involves contact with the infectious organism: Anthrax, fungus infections, undulant fever, erysipeloid, glanders, psittacosis, rabies, Rocky Mountain spotted fever, tetanus, tutaremia, Weil's disease; also tuberculosis, diphtheria, scarlet fever, etc., in occupational situations.
G—Radiant energy:
1—X-rays, radium and other radioactive substances (dermatitis, burns, necrosis of bone, cancer, anemia, leukemia)
2—Ultraviolet and infrared rays (burns, conjunctivitis, ophthalmia, cataract, dermatitis)
H—Repeated motion, pressure, shock, etc. (myositis, bursitis, synovitis, cramp, vasomotor disturbances).
I—Skin irritants, such as acids, alkalis, chromates, other salts, etc.
J—Carcinogenic chemicals:
1—Acting on skin such as tar, certain oils
2—Acting on bladder—aniline, benzidine, naphthylamine
K—Allergens—Those substances (such as fur dyes, flour, plants, etc.) capable of producing an allergic reaction, either dermatitis venenata or asthma, in sensitized individuals
L—Poisons—The list of toxic substances which may be encountered in industry is too long to enumerate and is constantly growing as new chemicals find industrial use. Many of them fall into one or other of the following three categories:
1—Metals—such as lead, arsenic, mercury, cadmium, barium, manganese, antimony
2—Gases—such as carbon monoxide, cyanogen, arsine, nitrous oxide, chlorine, phosgene
3—Volatile solvents—such as benzine, benzol, carbon tetrachloride, toluol, carbon bisulphide, trichlorethylene, tetrachlorethane and many others

Knowledge of materials handled—Having informed himself of what substances and conditions may give rise to occupational disease, the next step for the medical director is to discover whether

they are operating in his particular establishment. Here, familiarity with all the workings of the plant, already advocated for accident prevention, is equally necessary. In particular, the doctor should be familiar with all the chemical materials which are handled in his plant and their toxicological properties so that he may judge whether or not there is the possibility of a health hazard. There are certain standard textbooks to which he should have ready reference (see list on p. 47) which will be helpful in this connection.

Institution of protective measures—If it has been established that a potential health hazard exists but there is uncertainty as to its severity or the adequacy of control measures, a plant survey with air analyses should be carried out by a competent authority. Here again, in New York State, the Division of Industrial Hygiene of the State Labor Department may be called upon, and will not only make the necessary tests, but will advise industry concerning *proper exhaust ventilation* or other protective measures.

In some situations where exhaust ventilation is not practicable such as, for example, in cleaning out tanks, special respiratory protection in the form of *respirators* may be necessary.

The plant physician, no less than the "safety man", should be familiar with approved types of respirators, should understand their limitations and their proper care. *Helpful information on this subject may be found in Special Bulletin No. 3 of the United States Department of Labor, Division of Labor Standards, entitled "Protecting Plant Manpower."*[23]

The management should take upon itself the responsibility of reporting to the medical department changes in processes or the intended introduction of new substances. If such new substances prove, on investigation, to have harmful potentialities, then proper protective measures can be introduced simultaneously with their use. Indeed, in considering a new building, such factors should be taken into account when blue prints are being drawn up.

Special supervision of exposed workers—Sometimes, harmless materials may be substituted for toxic ones. Whenever this is possible it should be done, but if it is not feasible, then control measures should include special medical supervision for the exposed workers. What this should consist of will, of course, depend upon the particular substance, the efficiency of control and the particular process in which it is used.

In general, individuals to be employed where toxic substances are handled should be chosen with unusual care in the first place to make sure that no tendency is present which might be aggravated by the exposure. For example, a person suffering from anemia should not work where there is exposure to lead or benzol.

After employment, it is obviously better not to wait until actual symptoms of illness intervene for an indication of over-exposure, but to remove the individual from that job when he shows any evidence of undesirable physiological effects. Therefore, in addition

to careful pre-placement examinations, *periodic follow-up examinations should be made at regular intervals so long as the exposure continues* (see page 29). Such check-up examinations need not be complete, but should include the tests that can best be relied on to indicate the earliest toxic effects from the substance in question. When such effects are found it should be possible to transfer the person so affected to other work until subsequent tests show that his or her condition has returned to normal. The condition which produced the abnormality should also be re-evaluated to discover whether control of the hazard can be improved to prevent future trouble.

Health Education

The fourth item in the preventive program of the factory medical department is the education of its industrial group in matters pertaining to accident prevention, the prevention of occupational diseases, and the elements of personal hygiene. The intelligent cooperation of all employees in a preventive health program is necessary to its fulfillment, and their part in it and responsibility for its success should be made clear to them. Whatever means seem to lend themselves best to this purpose in any particular plant are the ones to rely on. Any or all of the following may be useful:

Talks by the medical director, the nurse, members of the safety committee, or experienced individuals from outside the plant such as the physicians or safety engineers of the Labor Department. All talks should be short and to the point. Boredom of the audience defeats their purpose.

Movies are always acceptable educational aids. Good movies on accident prevention, the prevention of silicosis and other subjects are obtainable from the United States Public Health Service.

Leaflets and posters on the prevention of accidents and occupational diseases, the prevention of colds, etc., may be secured from Federal and State Labor Departments, safety councils, United States Public Health Service, etc.[10 11 14]. Posters displayed in conspicuous places are particularly good as reminders of the need for caution and precaution. They attract attention by dramatization of ideas.

In addition to the agencies mentioned there are various commercial services which undertake to supply industrial establishments with bulletin board material and posters on the subject of industrial health and safety.

Competitions with awards for the best health or safety record between departments or between plants of a single company doing the same type of work are very useful means of stimulating cooperation in a health and safety program through appeal to the competitive spirit.

Personal contact—It has already been said and should be emphasized again that as much, or more, educational work may be done by the interested nurse and doctor in their personal contacts with employees than can often be achieved by impersonal means.

Records

A systematic, simple and efficient record-keeping system is an integral part of a well-run medical department, adding immeasur-

Reproduced by courtesy of Elliott Service Co., Inc., New York

Figure 7. Example of an educational poster for use in industrial plants

ably to its efficiency. Standardized forms should be used for recording the initial and subsequent physical examinations and for every dispensary visit. Forms for use in cases of accident or occupational disease may be obtained from the Division of Compensation of the New York State Labor Department, and should be kept on hand.

The form for the initial physical examination should include space for the personal history, taken at the time, in which particular attention should be paid to previous illnesses and occupations. A type of form which allows comparison of the results of periodic examinations is useful.

In addition to the examination forms, there should be forms on which to record visits to the dispensary, taking note of the date, the department in which the individual is employed, the cause of the visit and the treatment given, or other disposition of the case. All employees should report routinely to the medical department after *any* absence in order that a proper record of the cause may be made.

From such well kept dispensary records, valuable information may be obtained, not only in regard to the health of a given individual, in itself important, but also as to the possible presence of an unsuspected health hazard in some department. An unusual number of colds among the workers in a certain room, for instance, might call attention to faulty ventilation; an unusual number of complaints of headaches or indigestion in another department to a harmful concentration of toxic gases of fumes.

When records are well kept, it is possible to prepare monthly and annual statistical summaries which will show clearly what the medical department is accomplishing.

A recommended form for such a summary is that shown in Figure 8 taken from the American College of Surgeons.[1] The information so presented can conveniently be compared from year to year, and used to encourage medical staff, safety committee, and working force to redoubled efforts toward the desired goal of elimination of occupational hazards and the achievement of an ever healthier, happier, and more efficient industrial group.

ANNUAL STATISTICAL SUMMARY

INJURY AND ILLNESS EXPERIENCE—MEDICAL AND COMPENSATION COSTS

Date.....

1. Name of company.....
2. Address.....
3. Nature of industry.....
4. Average number of employees.....Male.....Female.....
5. Number of injuries during the year.....
6. Number of lost time injury cases.....Lost time occupational disease cases.....
7. Number of employees receiving compensation for

   Industrial injuries.....Occupational diseases.....
8. Injury frequency rate (Number lost time injuries × 1,000,000 divided by total man hours worked.).....
9. Injury severity rate (Number days lost × 1,000 divided by total man hours worked.).....
10. Working days lost: From industrial injuries.....

    From occupational diseases.....

    From non-industrial injuries and illnesses.....
11. Number of employees hospitalized for industrial injuries and occupational diseases.....

    Total days of hospitalization.....
12. Number of dispensary visits during the year.....
13. Medical and compensation costs (Industrial injuries, occupational diseases, and medical preventive measures for employees only.)

    a. Doctors' and nurses' services.....

    b. Hospital service.....

    c. Administration (clerical, etc.).....

    d. Supplies.....

    e. Compensation.....

    f. Total cost (sum of a, b, c, d, e).....

    g. Cost per capita.....

    h. Cost per $100.00 payroll.....

    By.....

    Official Position.....

Figure 8 — Form for Annual Statistical Summary of Medical Department

Source: American College of Surgeons.[1]

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APPENDIX A

SUGGESTIONS FOR AN INDUSTRIAL DISPENSARY

NATIONAL ASSOCIATION OF MANUFACTURERS
COMMITTEE ON HEALTHFUL WORKING CONDITIONS

For factories of 200 employees or less, the medical dispensary should have approximately 125 sq. ft. of floor space with a partition or semi-permanent screen dividing it into two rooms. It should be situated as near production equipment as possible, with the following qualifications kept in mind:

a—Quietness
b—Good ventilation
c—Adequate heating
d—Toilet facilities
e—Hot and cold running water
f—Natural and artificial illumination

It should be painted in light colors, spotlessly maintained; have a waiting bench or seats accessible, and include at least the following equipment:

1 file for medical records
1 adjustable floor lamp
1 instrument cabinet
1 folding stretcher
1 cot
1 table, enameled top (kitchen size)
2 white enamel chairs
1 sanitary can with cover
1 portable first aid kit
1 stool
1 small sterilizer (gas, electric, alcohol, steam or oil)

(Small equipment such as basins, 2-qt. pitcher, appropriate instruments)
Estimated total cost, including construction of walls of room—$300.

For factories employing between 200 and 500 employees, there should be approximately 300 sq. ft. of floor space, divided into two rooms. They should be *situated as described above* for smaller factories, and should contain at least the following equipment:

In treatment room:

1 file for medical records
3 chairs, white enamel
1 adjustable floor lamp
1 instrument cabinet
1 sanitary can with cover
1 folding stretcher
1 portable first aid kit
1 stool
1 chair, white enamel, with head rest
2 tables, enameled top (kitchen size)
1 small sterilizer (gas, electric, alcohol, steam or oil)

In examination room:

1 cot
1 stool
1 scale
1 examination table
1 small desk or table
1 chair, white enamel
Miscellaneous equipment, such as eye chart, blankets, etc.

(Smaller additional equipment, such as basins, pitchers, foot baths, arm baths, and appropriate instruments)
Estimated total cost, including construction of walls of room—$425.

APPENDIX B(1)

A METHOD FOR MAKING ROUTINE PHYSICAL EXAMINATIONS OF MALE APPLICANTS FOR EMPLOYMENT IN INDUSTRY

NEW ENGLAND CONFERENCE OF INDUSTRIAL PHYSICIANS[7]

1—Height and weight in ordinary clothing.
2—(a) Examination of eyes for color blindness.
(b) Examination by Snellen charts of vision, both without and with correction.

NOTE: Numbers 1 and 2 can be done before the following by a nurse.

3—Male applicants stripped to the waist and with both feet bare.
4—General inspection with applicant standing. Romberg tried.
5—Applicant sits facing examiner who is standing and hearing is tested with Ingersoll watch. Hair and scalp inspected.
6—Examiner sits: Right ear, right eye, left eye, left ear, nose, mouth, and throat examined in this order with head mirror.
7—Neck inspected and palpated.
8—Chest inspected while comparing pulses. Precordium palpated while counting pulse beat.
9—Completion of chest examination.
10—Test knee jerks.
11—Applicant stands and drops clothing to ankles.
12—Genitalia and inguinal canal inspected and palpated.
13—Applicant faces about and bends forward.
14—Spinal and anal inspection and palpation.
15—Legs inspected.
16—Applicant pulls up clothing, and feet are examined.
17—Simple movements of extremities will show any joint involvement.
18—Blood pressure taken if indicated or on applicants over 40 years of age.
19—Any other laboratory tests indicated.

APPENDIX B(2)

PHYSICAL EXAMINATION PROCEDURE

CONFERENCE BOARD OF PHYSICIANS IN INDUSTRY, NATIONAL INDUSTRIAL CONFERENCE BOARD[7]

An outline of the principal points to be kept in mind when making a physical examination of applicants or employees. It is understood, however, that in many cases and for many purposes a partial examination only will be necessary, and that, barring special cases, the examination would consume an average of from six to 10 minutes per person. It is also understood that the procedure may be added to or subtracted from as the peculiar requirements of each industry may make advisable in the judgment of the examining physician.

Special Senses

(a) Eyes:

Visual Acuity: Right Eye:.....Left Eye:.....

Visual Acuity of 20/40 or less in both eyes indicates specified employment. Class III, and further investigation.

Visual Acuity of less than 20/30 in one eye and less than 20/200 in the other with suitable correction indicates specified employment. Class III.

A greater disparity in vision of the two eyes indicates need for further investigation.

Reading Test: Right Eye:.....Left Eye:.....
.....Size of type.....
..... Distance .....

Field of Vision: Right Eye:.....Left Eye:.....
.....Normal or Limited.....
Loss of more than one-third of field of vision of both eyes, or loss of two-thirds of field of either eye, indicates specified employment. Class III.

Color Sense: Ability to match colors and call them correctly.

Pupils: Reaction

Puffiness of Lids:

(b) Ears:

Drums: Right Ear.....Left Ear.....
..... Appearance .....
.....Hearing Power .....
.....By Watch .....

Use Ingersoll $1 watch at 36" as normal. Any variation from normal to be indicated by the fraction 36, denominator being distance at which watch can be heard. Deafness to be indicated by the word "contact". Hearing power of less than one-half normal indicates specified employment. Class III.

(c) Nose:

Septum
Turbinates
Obstruction

(d) Mouth and Throat:

Condition of teeth.

Suggested classification for conditions of teeth:

1. Good—no repair needed.
2. Fair—minor defects; treatment advisable.
3. Bad—serious defects needing immediate corrective treatment.

Condition of gums.

Condition of tonsils.

Diseased tonsils in adult should be removed. Such cases should be followed and removal advised. In absence of other disability diseased tonsils should put the person examined in Class II.

Thyroid enlargement.

Chest Examination:

(a) Heart:

1. Myocardial test.
   Effort syndrome—pulse reading before and after exercise.
2. Blood-pressure taken on all cases over 40 years of age; others as indicated.
3. Valvular disease—compensated or uncompensated.
4. Arrhythmia
5. Tachycardia

(b) Lungs:

1. Inspection—lagging, apical retractions.
2. Auscultation—eight points to examine closely as follows:

   Front:
   Apex of lungs—right and left
   Infraclavicular space—right and left

   Back:
   Suprascapular space—right and left
   Base of lung—right and left

Abdomen: Inspection—abdominal tumors.

Hernia:

Inguinal—complete, incomplete, oblique, direct.
Size of external ring.
Impulse, present or absent.
Femoral hernia.
Ventral hernia.
Umbilical hernia.
Post-operative.
Abdominal wall.

Spine:

Curvature.
Mobility.

Anus:

Examined for:

Hemorrhoids
Fissures
Fistulae
Protrusions

Genitals:

Examined for varicocele and hydrocele.

Extremities

(a) Lower:

Varicose veins.
Joint motility.
Loss of member.
Deep reflexes.
Foot strain.

(b) Upper:

Joint motility.
Loss of member.
Loss of digits.
Tremors.

General:

Gait
Romberg
Skin

Height, Weight, and Age to be recorded.

APPENDIX C(1)

FORM FROM INDUSTRIAL COMMISSION OF WISCONSIN [13]

PHYSICAL EXAMINATION

(To be retained by Examining Physician)

Employer.....Address.....Exam. No.....

Name.....Date of Birth.....Age.....M....S....W....D....M....F....
(Please type or print)

Occupational History; (Past jobs .... exact occupation, and duration of each).....

.....

.....

.....

.....

Medical History. (Respiratory diseases in past or any past disability due to employment).....

	Original Examination Date	Re-examination Date	Re-examination Date	Re-examination Date
Prospective employee? (State exact occupation)				
Old Employee? (Exact occupation & yrs.)				
Present Complaints				
Loss of Weight				
Identifying marks or scars				
Vision Rt. eye Official	Corrected to:	Corrected to:	Corrected to:	Corrected to:
Vision Lft. eye eye chart				
Hearing (rough est.)				
Teeth				
Throat				
Heart — (rate & abnormal findings)				
Blood Pressure				
Chest & Lungs				
Abdomen				

APPENDIX C(1) *(Continued)*

	Original Examination Date	Re-examination Date	Re-examination Date	Re-examination Date
Back				
Hernias				
Skin				
Extremities				
Reflexes				
Varicose Veins				
Glands				
Temperature				
Sputum (only when indicated)				
Blood Count (Tallquist and blood smear)				
Sedimentation in MM. (Only when indicated)				
Urine, Alb. & Sugar				
Blood for syphilis				
Miscellaneous				
Comment				
X-ray of chest by whom?				
Examination by whom?				
Special Examinations where indicated in specific industries. Tabulate findings.				

X-ray findings and Recommendations.....

Family Physician..... Date Contacted.....

APPENDIX C(2)

Form From American College of Surgeons[1]

MEDICAL RECORD

RE-EXAMINATIONS AND ADDITIONAL INFORMATION

Date

PHYSICAL EXAMINATION RECORD Classification: A B C D

Name_____ Address_____ Check No._____

Dept._____ Age_____ Nationality_____ S. M. W. D. No. of Children_____ Date_____

PAST HISTORY: Has the applicant been subject to any of the following?

Tuberculosis_____
Asthma_____
Arthritis_____
Otitis Media_____
Epilepsy_____
Venereal Dis._____
Flat Feet_____
Hernia_____
Operations_____

INJURY, Head_____ Back_____ Extrem._____ Old Fractures_____
Describe and give % disability, if any_____

OCCUPATIONAL HISTORY:

List Occupational Diseases and Injuries Compensated_____

I certify that my above answers are true, correctly recorded, and that I am in good health

(Signature of Applicant)

Witness

PHYSICAL EXAMINATION

General Condition and Nutrition { Good / Poor } Height ____ feet ____ inches. Weight, present ____ usual ____

Chest measure, full inspiration ____ inches; full expiration ____ inches. Waist measurement ____ inches

		Near		Far	
Vision	Without Glasses	R WD /	L WD /	R 20 /	L 20 /
	With Glasses	R WD /	L WD /	R 20 /	L 20 /

Smallpox: Has had smallpox ____; Old vaccination scar (5 yrs. or more) ____; Recent vaccination scar (under 5 yrs.) ____; No vaccination scar ____; Vaccinated by examiner ____

Hearing: R {Normal / Impaired} L {Normal / Impaired}

Typhoid, Year of last vaccination ____

Ears ____ Nose ____ Throat and tonsils ____ Teeth ____

Pulse rate ____ Temp. ____ B. P.: Systolic ____ Diastolic ____

Heart ____

Lungs ____

Abdomen ____ Hernia ____

Spine ____ Hemorrhoids ____

Upper Extremities ____

Lower Extremities ____

Skin ____ Glands ____ Venereal Disease ____

Reflexes: Pupillary ____ Patellar ____ Romberg test ____ Urine: Albumin ____ Sugar ____

Other Findings and Remarks ____

Note defects, varicosities, scars, etc.
If classified C or D give reasons under Remarks

Examined by ____ M. D.

FORM 1103 ACS PHYSICIANS' RECORD CO., CHICAGO PRINTED IN U.S.A.

APPENDIX D

STANDARDIZED MEDICAL TERMINOLOGY

CONFERENCE BOARD OF PHYSICIANS IN INDUSTRY[7]

The following are the recommended limitations of degrees of defect for the conditions indicated:

Hernia Degrees:

1st degree: External ring admits tip of little finger, impulse felt.
2nd degree: External ring admits thumb, protrusion.
3rd degree: External ring patulous; bubonocele.
4th degree: Mass reaches external ring level.
5th degree: Mass scrotal.

Varicosity Degrees:

1st degree: Venous mottlings on one or both lower extremities.
2nd degree: Venous cords visible on one or both lower extremities.
3rd degree: Venous cords visible and palpable on one or both lower extremities.

Flat Feet Degrees:

1st degree: One or both arches sagging.
2nd degree: One or both arches touch floor.
3rd degree: One or both arches touch floor with eversion deformity.

Varicocele Degrees:

1st degree: Thickening of cord.
2nd degree: Thickening of cord with dangling testicle and scrotum with laxity.

Vision Defective Degrees:

1st degree equal to 20/20 in one eye; 20/40 in other.
2nd degree equal to 20/40 in one eye; 20/70 in other.
3rd degree equal to 20/70 in one eye; 20/100 in other.
4th degree equal to 20/100 in one eye; 20/200 in other.

Hearing Defective Degrees:

1st degree equal spoken voice at 20 feet; Ingersoll $1.00 watch at 36 inches; one or both ears.

2nd degree equal spoken voice at 10 feet; Ingersoll $1.00 watch at 18 inches; one or both ears.

3rd degree equal spoken voice at 5 feet; Ingersoll $1.00 watch at 9 inches; one or both ears.

4th degree equal spoken voice at 2 feet; Ingersoll $1.00 watch at 4½ inches; one or both ears.

Persons examined showing defects of the following severity should be classed as substandard:

Hernia, 2nd degree or more.
Varicosities, 2nd degree or more.
Flat Feet, 2nd degree or more.
Varicocele, 2nd degree or more.
Hearing, 2nd degree or more.
Vision, 2nd degree or more.

Also the following:

Arteriosclerosis.
Endocarditis
Tuberculosis-active
Bronchitis, Emphysema, Asthma } Chronic

APPENDIX E

RECOMMENDED DAILY FOOD ALLOWANCES

FOOD AND NUTRITION BOARD OF THE NATIONAL RESEARCH COUNCIL[15]

Milk: At least one pint.
Potatoes: Two servings.
Fruit: Two servings, one citrus.
(Tomato juice may be substituted for the latter.)
Vegetables: Two servings, one green or yellow.
Eggs: One.
Meat, fish or poultry: One serving.
Cereal: One dish, whole grain.
Bread: Whole grain or enriched at each meal.
Butter: Or fortified oleomargarine.
Remaining calories to be supplied by a choice of vitamin-rich foods.

RECOMMENDED DIETARY ALLOWANCES *

MAN (70 Kg):

Sedentary—Calories, 2,500; Thiamin (B_1) mg.**, 1.5; Riboflavin mg., 2.2; Niacin (Nicotine acid) mg., 15.

Moderately active—Calories, 3,000; Protein grams, 70; Calcium grams, 0.8; Iron mg., 12; Vitamin A*** I. U., 5,000; Thiamin (B_1) mg.**, 1.8; Riboflavin mg., 2.7; Niacin (Nicotine acid) mg., 18; Ascorbic acid mg.**, 75; Vitamin D, I. U., †††.

Very active—Calories, 4,500; Thiamin (B_1) mg.**, 2.3; Riboflavin mg., 3.3; Niacin (Nicotine acid) mg., 23.

WOMAN (56 Kg):

Sedentary—Calories, 2,100; Thiamin (B_1) mg.**, 1.2; Riboflavin mg., 1.8; Niacin (Nicotine acid) mg., 12.

Moderately active—Calories, 2,500; Protein grams, 60; Calcium grams, 0.8; Iron, mg., 12; Vitamin A*** I. U., 5,000; Thiamin (B_1) mg.**, 1.5; Riboflavin mg., 2.2; Niacin (Nicotine acid) mg., 15; Ascorbic acid mg.**, 70; Vitamin D, I. U., †††.

Very active—Calories, 3,000; Thiamin (B_1) mg.**, 1.8; Riboflavin mg., 2.7; Niacin (Nicotine acid) mg., 18.

The requirement for iodine is small; probably about 0.002 to 0.004 milligram a day for each kilogram of bodyweight. This amounts to about 0.15 to 0.30 milligram daily for the adult. This need is easily met by regular use of iodized salt.

The requirement for copper for adults is in the neighborhood of 1.0 to 2.0 milligrams a day, approximately one-tenth of that for iron.

The requirement for Vitamin K is usually satisfied by any good diet.

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* Tentative goal toward which to aim in planning practical dietaries; can be met by a good diet of natural foods. Such a diet will also provide other minerals and vitamins the requirements for which are less well known.

** 1 mg. thiamin equals 333 I. U.; 1 mg. ascorbic acid equals 20 I. U.

*** Requirements may be less if provided as Vitamin A; greater if provided chiefly as the pro-vitamin carotene.

††† Vitamin D is undoubtedly necessary for older children and adults. When not available from sunshine, it should be provided probably up to the minimum amounts recommended for infants, 400 to 800 I. U.

APPENDIX F

SANITARY REQUIREMENTS FOR FACTORIES IN NEW YORK

SELECTED SECTIONS OF LABOR LAW[16]

Cleanliness and Safety of Buildings—§ 291

Every part of a factory building and of the premises thereof and the plumbing therein, shall at all times be kept in a safe and sanitary condition and in proper repair. The walls and ceiling of the rooms and hallways in every factory building shall be kept in clean condition.

Cleanliness and Safety of Rooms—§ 290

Every room in a factory and every part thereof and all fixtures therein shall at all times be kept in a safe and sanitary condition and in proper repair. No person shall expectorate upon the walls, floors or stairs of a factory or of the building in which it is located. Suitable receptacles shall be provided and used for the storage of waste and refuse. The walls and ceiling of the rooms and hallways in every factory shall be kept in a clean condition.

Dressing Rooms—§ 294

There shall be provided in every factory where females are employed dressing or emergency rooms having at least one window leading to the outer air. Where more than ten females are employed, one or more separate dressing rooms shall be provided. All dressing rooms shall be separated from water-closets by suitable partitions, shall have adequate floor space in proportion to the number of employees, shall be provided with seats and with suitable means for hanging clothes, and shall be constructed, heated, ventilated, lighted and maintained in accordance with the rules of the board.*

Drinking Water—§ 292

There shall be provided in every factory at all times for the use of employees a sufficient supply of clean and pure drinking water, and if placed in receptacles the same shall be properly covered and kept clean.

Prohibition Against Eating Meals in Certain Workrooms—§ 205

No employee shall take or be permitted to take any food into a room of any working place where lead, arsenic or other poisonous substances or injurious or noxious fumes, dust or gases exist in harmful conditions or are present in harmful quantities as an incident or result of the business carried on in such working place. Notice to the foregoing effect shall be posted in such room. No employee, unless his presence is necessary for the proper conduct of the business, shall remain in any such room during the time allowed for meals. The employer shall provide a suitable place in such establishment in which the employees may eat.

Seats for Female Employees—§ 150

A sufficient number of suitable seats, with backs where practicable, shall be provided and maintained in every factory, mercantile establishment, freight or passenger elevator, hotel and restaurant for female employees who shall be allowed to use the seats to such an extent as may be reasonable for the preservation of their health. In factories, female employees shall be allowed to use such seats whenever they are engaged in work which can be properly performed in a sitting posture. In mercantile establishments, at least one seat shall be provided for every three female employees and if the duties of such employees are to be performed principally in front of a counter, table, desk or fixture, such seats shall be placed in front thereof, or if such duties are to be performed principally behind such counter, table, desk or fixture they shall be placed behind the same.

Size of Rooms; Air Space per Person—§ 300

No greater number of persons shall be employed in any room of a factory between six o'clock in the morning and six o'clock in the evening than will allow each person so employed two hundred and fifty cubic feet of air space nor, unless by written permit of the commissioner,† than will allow four hundred cubic feet of air space for each person employed between six o'clock in the evening and six o'clock in the morning. Such rooms shall be lighted by electricity whenever persons are employed therein between six o'clock in the evening and six o'clock in the morning.

Unclean Factories—§ 297

1. If the commissioner† finds evidence of contagious disease in a factory, he shall affix to the articles therein exposed to contagion a label containing the word "unclean" and shall notify the local department or board of health, which after disinfecting the articles may remove such label.

2. If the commissioner† finds that the factory or work room therein is unsanitary, the commissioner may, upon filing in his office a written order stating the reasons therefor, affix to any articles therein a label containing the word "unclean." Such label shall be removed only by an authorized representative of the commissioner and not until such articles are removed from the factory and cleaned, or until the factory or work room is made sanitary.

Ventilation, Heating and Humidity—§ 299

1. Every workroom in a factory shall be provided with proper and sufficient means of ventilation, natural or mechanical or both, as may be necessary, and there shall be maintained therein proper and sufficient ventilation and proper degrees of temperature and humidity at all times during the working hours.

2. All machinery creating dust or impurities shall be equipped with proper hoods and pipes connected to an exhaust fan of sufficient capacity and power to remove such dust or impurities; such fan shall be kept running constantly while such machinery is in use. If in case of wood-working machinery the board* decides that such apparatus is unnecessary for the health and welfare of the employees, it may adopt rules excepting such machinery from the operation of this subdivision.

3. If dust, gases, fumes, vapors, fibers or other impurities are generated or released in the course of the business carried on in any workroom of a factory, in quantities tending to injure the health of the employees, suction devices shall be provided which shall remove such impurities from the workroom, at their point of origin where practicable, by means of proper hoods

connected to conduits and exhaust fans. Such fans shall be kept running constantly while the impurities are being generated or released.

4. The board* shall make rules for and fix standards of ventilation, temperature and humidity in factories and shall prescribe the special means, if any, required for removing impurities or for reducing excessive heat, and the machinery, apparatus or appliances to be used for any of said purposes, and the construction, equipment, maintenance and operation thereof.

5. If any requirement of this section or any rule adopted thereunder be not complied with, the commissioner† shall issue an order directing compliance therewith within thirty days after the service thereof. He may in such order require plans and specifications to be filed. In such case, before providing or making any change or alteration in any machinery or apparatus for any of the purposes specified in this section, the person upon whom such order is served shall file with the commissioner plans and specifications therefor and shall obtain his approval of the same.

Washrooms—§ 293

1. There shall be provided and maintained for employees in every factory suitable and convenient washrooms separate for each sex, adequately equipped with washing facilities. Every washroom shall be adequately ventilated and heated and shall be lighted by artificial means where necessary.

2. In factories where lead, arsenic or other poisonous substances or injurious or noxious fumes, dust or gases are present as an incident or result of the business or occupation, hot water, soap and individual towels shall be furnished.

Waterclosets—§ 295

1. There shall be provided for every factory a sufficient number of suitable and convenient waterclosets. All waterclosets shall be maintained inside the factory building, except where in the opinion of the commissioner† it is impracticable to do so.

2. There shall be separate watercloset compartments or toilet rooms for females, constructed and maintained in accordance with the rules of the board.*

3. The use of any form of trough watercloset, latrine or school sink within any factory is prohibited except as may be permitted by the board* in its rules. Such appliances shall be replaced by proper individual waterclosets or by trough waterclosets conforming to the rules of the board, placed in watercloset compartments.

4. All waterclosets, urinals, watercloset compartments and toilet rooms and the plumbing in connection therewith shall be properly constructed, installed, ventilated, lighted, heated and maintained in accordance with the rules of the board.*

5. All watercloset compartments and toilet rooms and the fixtures therein shall be kept in a sanitary condition and in proper repair. The enclosure of each compartment and toilet room shall be kept clean from obscene writing or marking.

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* The State Board of Standards and Appeals which promulgates the Rules of the Industrial Code.

† The Industrial Commissioner of New York State.

APPENDIX G

INDUSTRIAL CODE BULLETINS

New York State Department of Labor

Recent Issues

No. Subject

Industrial Code Rules Nos. 2 and 3, *Reprint of Former Industrial Code Bulletin No.* 2, Relating to (2) Required Exits and the Enclosure of Interior Stairways Serving as Required Means of Exit in Factory Buildings Five Stories or Less in Height, Erected Prior to October 1, 1913; and (3) Storage of Combustible Material About Factory Stairways.

Industrial Code Rule No. 7, Relating to Fire-Resistive Construction (effective July 1, 1942).

9 and 16 *Combined. Reprint.* Sanitation of Factories and Mercantile Establishments (1 Pamphlet).

Industrial Code Rule No. 380, Relating to Existing Fire Escapes, (amending Industrial Code Bulletin No. 6, effective Jan. 1, 1942).

10 Equipment, Maintenance and Sanitation of Foundries and the Control of Dusts, Gases and Fumes in Foundries. (New Code, effective Feb. 1, 1942.)

12 *Reprint.* Removal of Dust, Gases and Fumes.

14 Part 1—Rules Relating to the Construction, Installation, Inspection and Maintenance of Steam Boilers.

Part 2—Rules Relating to Material for the Construction of Steam Boilers.

Extract of Boiler Code, revised and enlarged (Ind. Code Bull. No. 14) Rules 14-1 through 14-9. Sects. I, II, III of Part 1, as amended effective Feb. 1, 1940.

19 Guarding of Dangerous Machinery, Vats, Pans and Elevated Runways (with amendments effective Feb. 1, 1940.)

Supplement, Amended Rules 878 and 879 (Ind. Code Bul. No. 19) Relating to Guarding of Punching, Stamping, Drawing and Trimming Presses. Effective Feb. 1, 1940.

No. Subject

22 and 22-A *Combined.* (*Reprint* of 22 and 25) (22) Work in Compressed Air (Tunnels and Caissons) and (22-A) Tunnel Construction (General).

23 Rules Relating to Erection, Repair and Demolition of Buildings as amended effective Feb. 1, 1942.

25 Industrial Code Rule No. 25—Toxic Gases in Mines, Tunnels and Shafts. Adopted Dec. 28, 1939, effective Mar. 1, 1940.

26 General Construction and Exits of Buildings Erected After July 1, 1924, in Which Mercantile Establishments Are Conducted, as Amended April 25, 1939, effective July 1, 1939.

33 Control of Silica Dust in Rock Drilling (effective May 1, 1937) and Standards for Testing Dust Control Equipment and Dust Control Methods for the Purpose of Approval by the Board of Standards and Appeals (approved Mar. 22, 1938).

34 Control of Silica Dust in Stone Crushing operations. (New Code, effective July 1, 1942.)

35 Control of Silica Dust in Stone Cutting and Stone Finishing Industry, effective Sept. 1, 1941.

Previous Issues

1 Employment of Women in Canneries.

3 Cannery Labor Camps.

4 Bakeries and Confectioneries.

5 Fire Alarm Signal Systems (Revised June 1936).

6 and 13 *Combined.* (6) Existing Fire Escapes Which Do Not Serve as Required Exits, and (13) Specifications of Fire Escapes Accepted as Required Means of Exit.

8 Construction, Guarding, Equipment, Maintenance and Operation of Elevators, Dumbwaiters, Escalators, Hoists and Hoistways, in Factories and Mercantile Establishments.

APPENDIX G (*Continued*)

No.	Subject
11	Milling Industry and Malt House Elevators.
15	Smoking in Protected Portions of Factories and Special Classes of Occupancies.
17	Mines and Quarries.
18	Lighting in Factories and Mercantile Establishments.
20	Automatic Sprinkler Systems.
21	Window Cleaning.
24	Fire Drills.
27	Construction, Equipment, Maintenance and Operation of Laundries.
28	Arrangement and Guarding of Sewing Machines, Machinery Apparatus, Equipment, Furniture and Fixtures in Needle Trades.
29	Dry Dyeing Plants and Dry Cleaning Plants.
32	Spray Coating of Motor Vehicles

State Standard Building Code for Places of Public Assembly (Effective Oct. 1, 1941).